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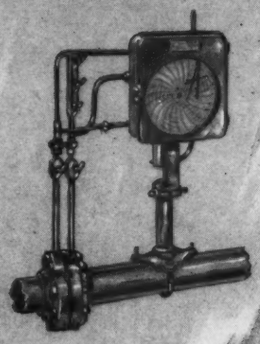
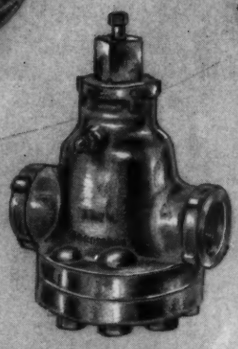
A SCIENCE IN ITSELF . . .

Designing and Building PRECISION *Equipment for the*

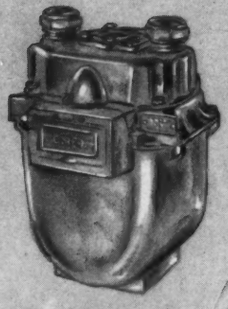
MEASUREMENT, REGULATION AND CONTROL OF FLOWING GASES



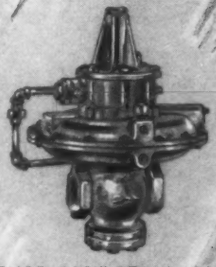
EMCO ORIFICE METER



NORDSTROM "HYPRESEAL" VALVE

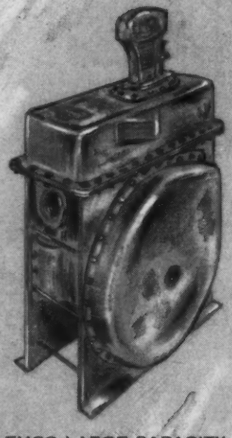


EMCO DOMESTIC IRON METER

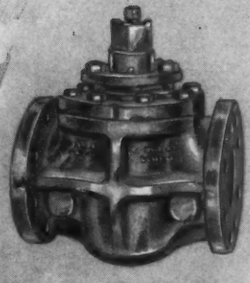


EMCO "1001" REGULATOR

EMCO TIN METER

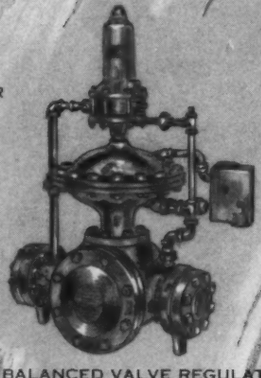


EMCO LARGE CAPACITY PRESSED STEEL METER



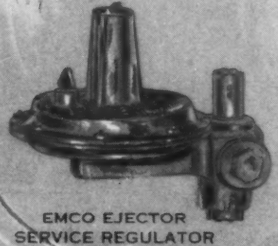
NORDSTROM STANDARD VALVE

EMCO APPLIANCE REGULATOR



EMCO BALANCED VALVE REGULATOR WITH PILOT LOADING SYSTEM

EMCO LARGE CAPACITY IRON METER



EMCO EJECTOR SERVICE REGULATOR

From the first crude simple pipeline, merely connecting supply with the point of utilization, to the highly complex yet efficient present day systems for the distribution of fuel gases, the research and technical facilities of this organization have contributed a multitude of improvements and advances to the science of transmitting gas.

The many basic products pioneered in the past, the new products recently announced and those still on the drawing boards are indicative of the progressive spirit of this organization. They personify the results obtainable from a carefully planned, adequately staffed, long range program of research and development.

PITTSBURGH EQUITABLE METER COMPANY
MERCO NORDSTROM VALVE CO.

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EMCO METERS AND REGULATORS • NORDSTROM LUBRICATED PLUG VALVES

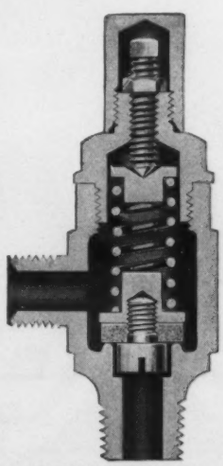
Safety+ with KITSON

Emergency Shut-off Gas Valves

The KITSON "Defender" Emergency Shut-off Gas Valve offers complete protection against "sticky" thermostats. Nothing serious can possibly happen, because the main burner gas supply is immediately cut off before damaging water temperatures are reached.

And, just as important, the "Defender" promptly points out thermostat trouble and protects the installation until the trouble has been straightened out.

Renewing the chemical fuse is simply and quickly done.



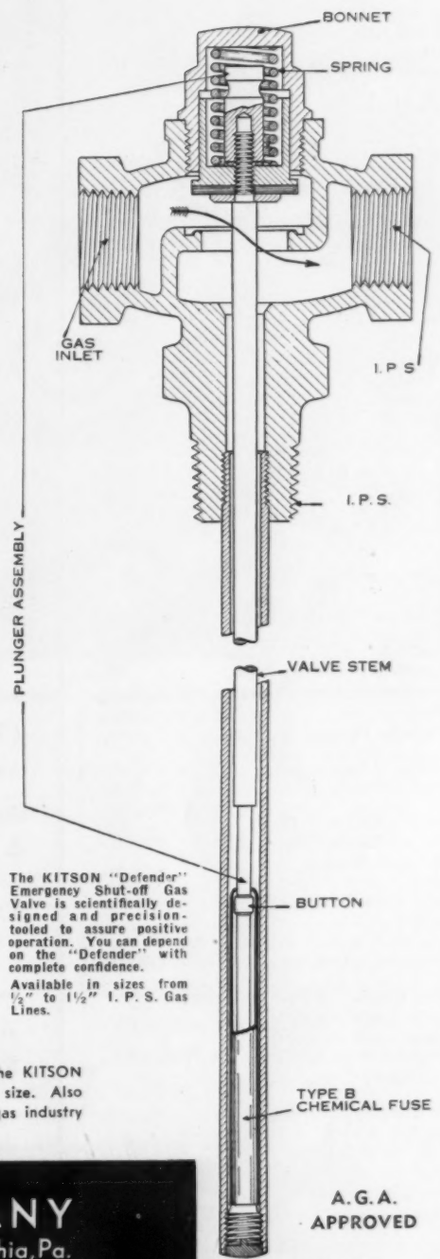
KITSON EXPANSION PRESSURE RELIEF VALVE TYPE E-P I

FOR CLOSED SYSTEMS

With open systems the KITSON "Defender" Emergency Shut-off Gas Valve is all that is needed for complete protection.

On closed systems, however, where pressure-reducing or check valves are installed, a KITSON Type E-P I Expansion Pressure Relief Valve is needed. This allows excess water from expansion to escape and eliminates the building up of water pressures.

The KITSON E-P I Expansion Pressure Relief Valve is adjustable within a practical range, and readily responds at the pressure for which it is set.



The KITSON "Defender" Emergency Shut-off Gas Valve is scientifically designed and precision-tooled to assure positive operation. You can depend on the "Defender" with complete confidence.

Available in sizes from ½" to 1½" I. P. S. Gas Lines.

A.G.A. APPROVED

KITSON "Defender"

We will be glad to send to any gas company a sample of the KITSON "Defender" for examination and test. Be sure to specify the size. Also ask for Catalog "A" covering the complete line of KITSON gas industry brass fittings.

KITSON COMPANY

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GAS

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Sixteenth Year of Publication

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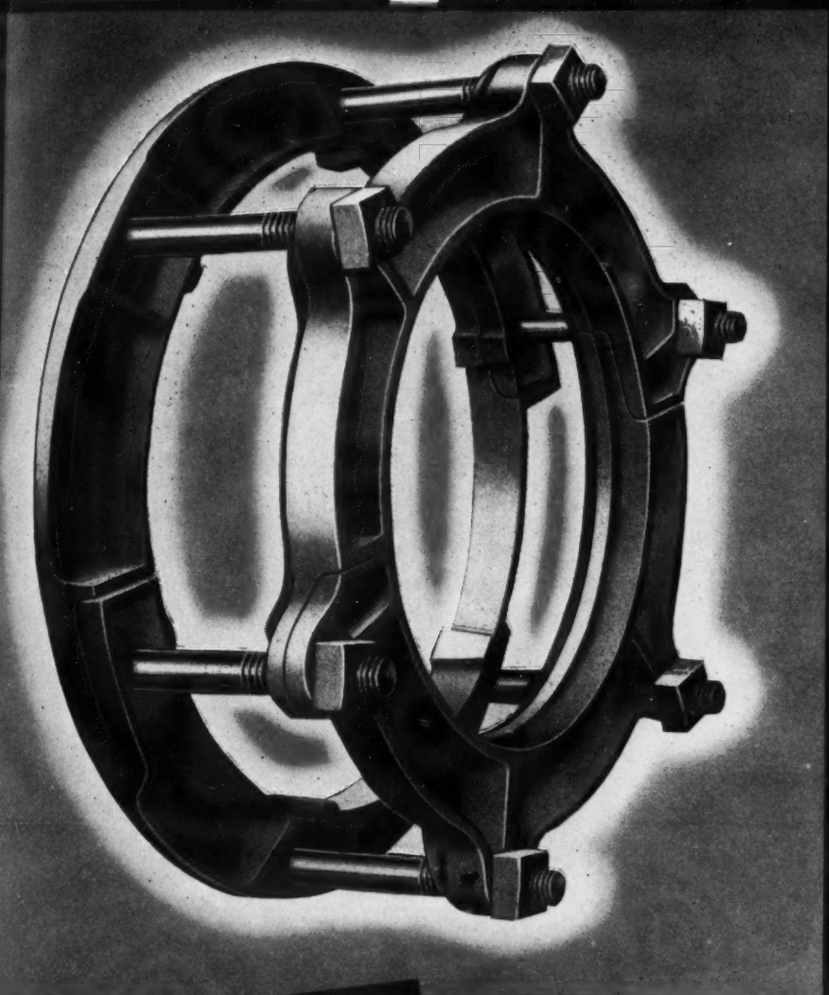
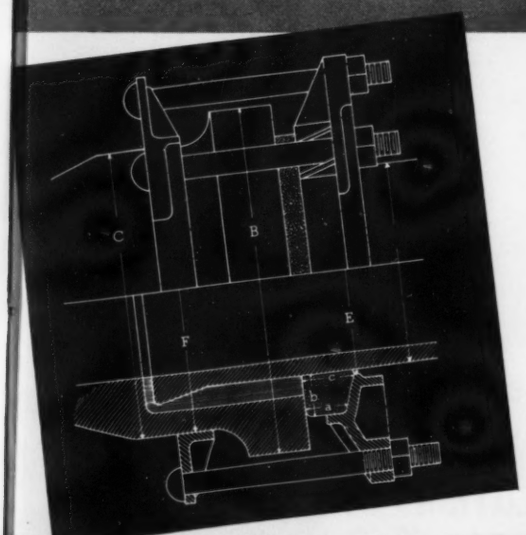
Dayton No. 12-B CLAMP



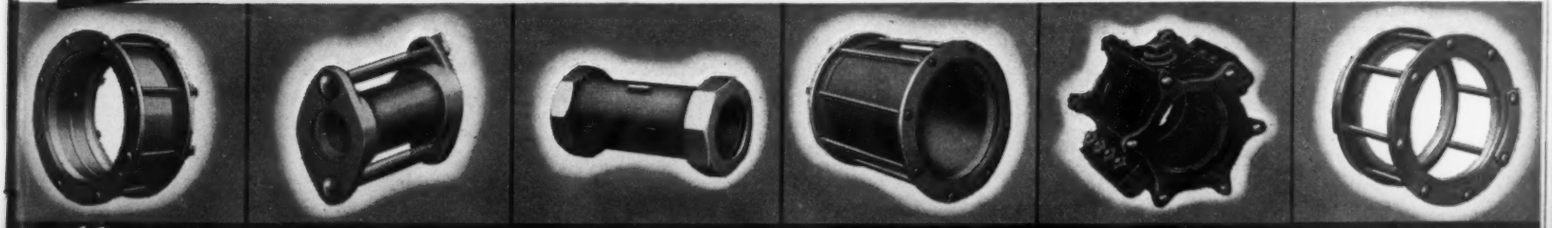
● The 12-B enjoys a remarkable record of efficiency and economy in repairing joint leaks in Bell and Spigot pipe.

This clamp features fewer parts, especially in the large sizes, which speeds up installation and reduces costs. A positive seal is assured with the 12-B as it is fashioned to the joint and its roundness corresponds in detail to pipe circumference.

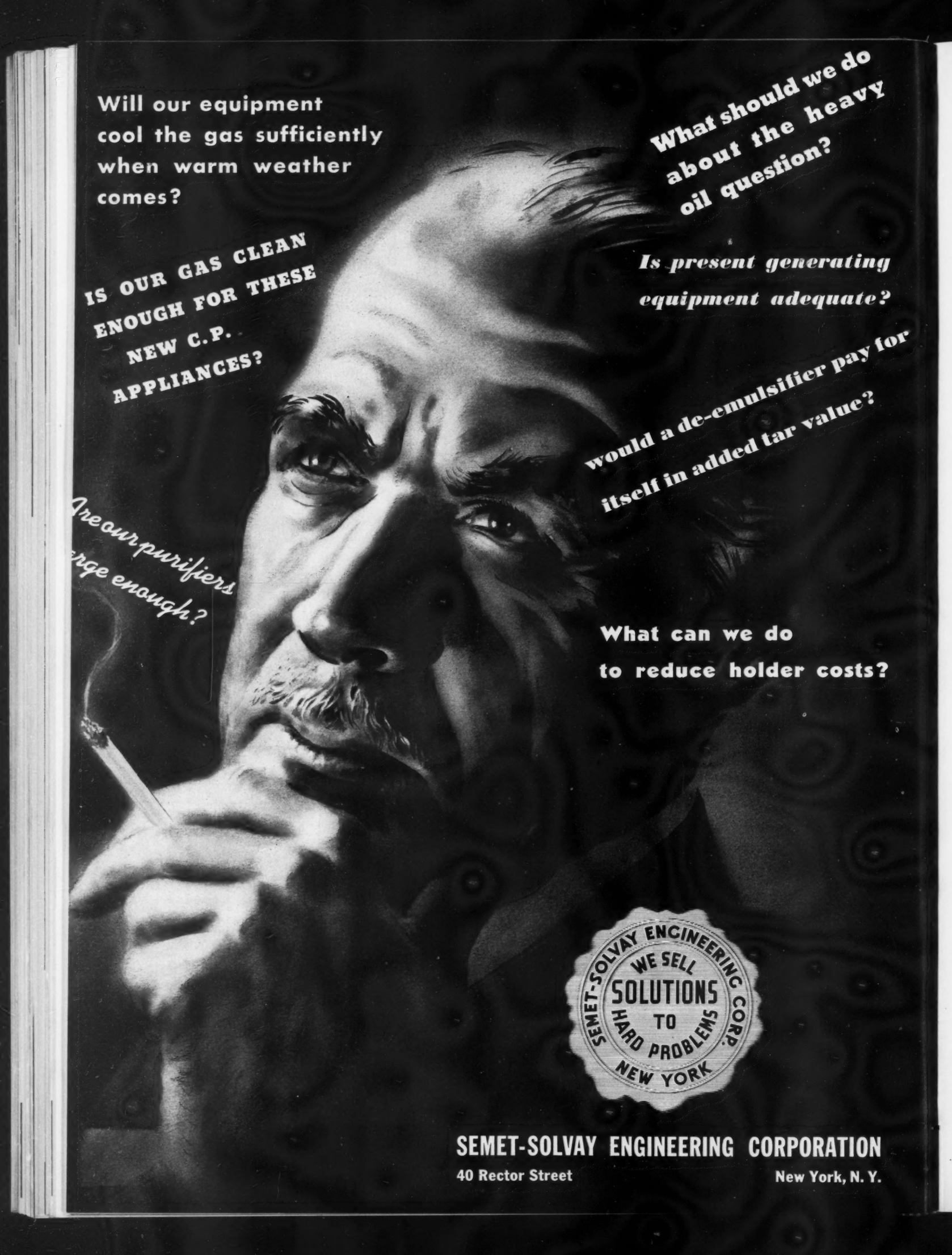
THE NATIONAL SUPPLY COMPANY
DAYTON COUPLING DIVISION
GRANT BUILDING
PITTSBURGH, PENNA.



PIPE SIZE INS.	PIPE AND BELL DIMENSIONS			FRONT RING ID	BACK RING ID	GASKET			BOLTS	
	A	B	C	E	F	a	b	c	No.	SIZE
3	3.80	7.40	5.98	3.938	6.250	.813	.938	1.00	4	⅝ x 5½
4	4.80	8.40	6.98	4.938	7.313	.938	.938	1.25	4	⅝ x 6
6	6.90	10.70	9.14	7.031	9.375	.938	.938	1.25	6	⅝ x 6
8	9.05	13.43	11.43	9.188	11.688	.938	.938	1.25	6	⅝ x 6
10	11.10	15.10	13.48	11.250	13.750	.938	.938	1.25	8	⅝ x 6½
12	13.20	17.40	15.70	13.375	16.000	.938	.938	1.25	8	⅝ x 7
16	17.40	22.00	20.20	17.625	20.563	.875	1.250	1.37	10	⅝ x 7
20	21.60	26.86	24.80	21.813	25.125	.875	1.250	1.37	15	⅝ x 7
24	25.80	31.26	29.16	26.000	29.500	.875	1.250	1.37	15	⅝ x 8
30	31.74	37.60	35.30	31.940	35.630	.875	1.250	1.37	16	⅝ x 8½
36	37.96	44.22	41.72	38.250	42.250	.875	1.250	1.37	20	⅝ x 8½



"Dayton" for Every Type of Coupled Line


Will our equipment cool the gas sufficiently when warm weather comes?
What should we do about the heavy oil question?
IS OUR GAS CLEAN ENOUGH FOR THESE NEW C.P. APPLIANCES?
Is present generating equipment adequate?
would a de-emulsifier pay for itself in added tar value?
Are our purifiers large enough?
What can we do to reduce holder costs?
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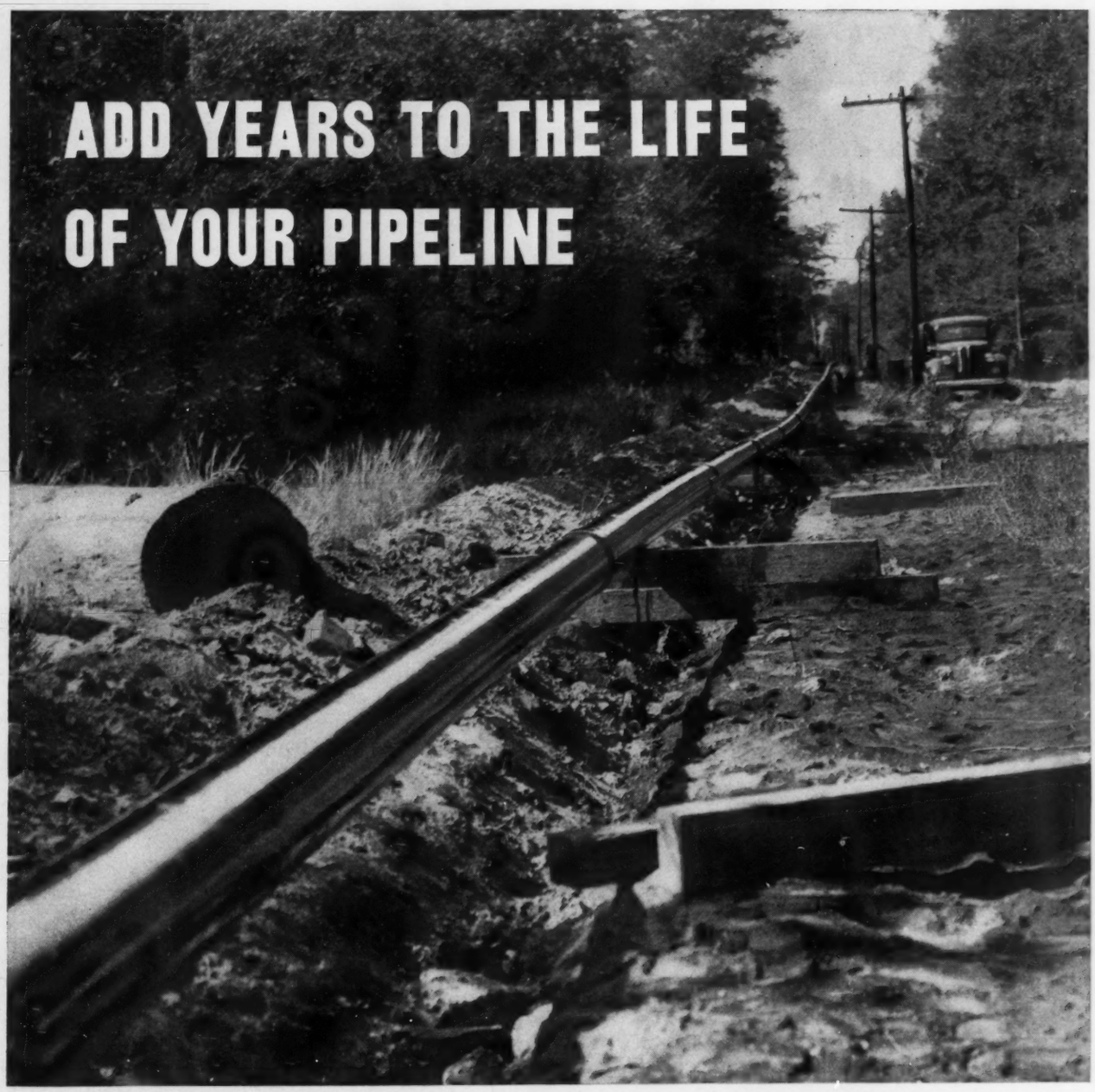

Barrett Application: Gulf Oil Corporation, Houston, Texas

BARRETT Pipeline Enamels increase the useful life of any underground pipe. Durable, adhesive and practically impervious to moisture, soil acids and damaging electrical currents, these enamels provide dependable protection at low cost.

In addition, Barrett Enamels are easy to apply and, because they contain a maximum percentage of coal-tar pitch, require less tonnage of material per unit area covered.

Barrett quality products and the close supervision of Barrett trained field men where Barrett Enamels are used are your complete assurance of lasting low cost per year service.

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FIELD SERVICE

As a guarantee that the utmost in service and protection will be obtained from the use of its products, The Barrett Company maintains a pipeline Service Department and Field Service men to assist on and inspect Barrett jobs. They will gladly discuss any pipeline problem with you.

Barrett
PIPELINE
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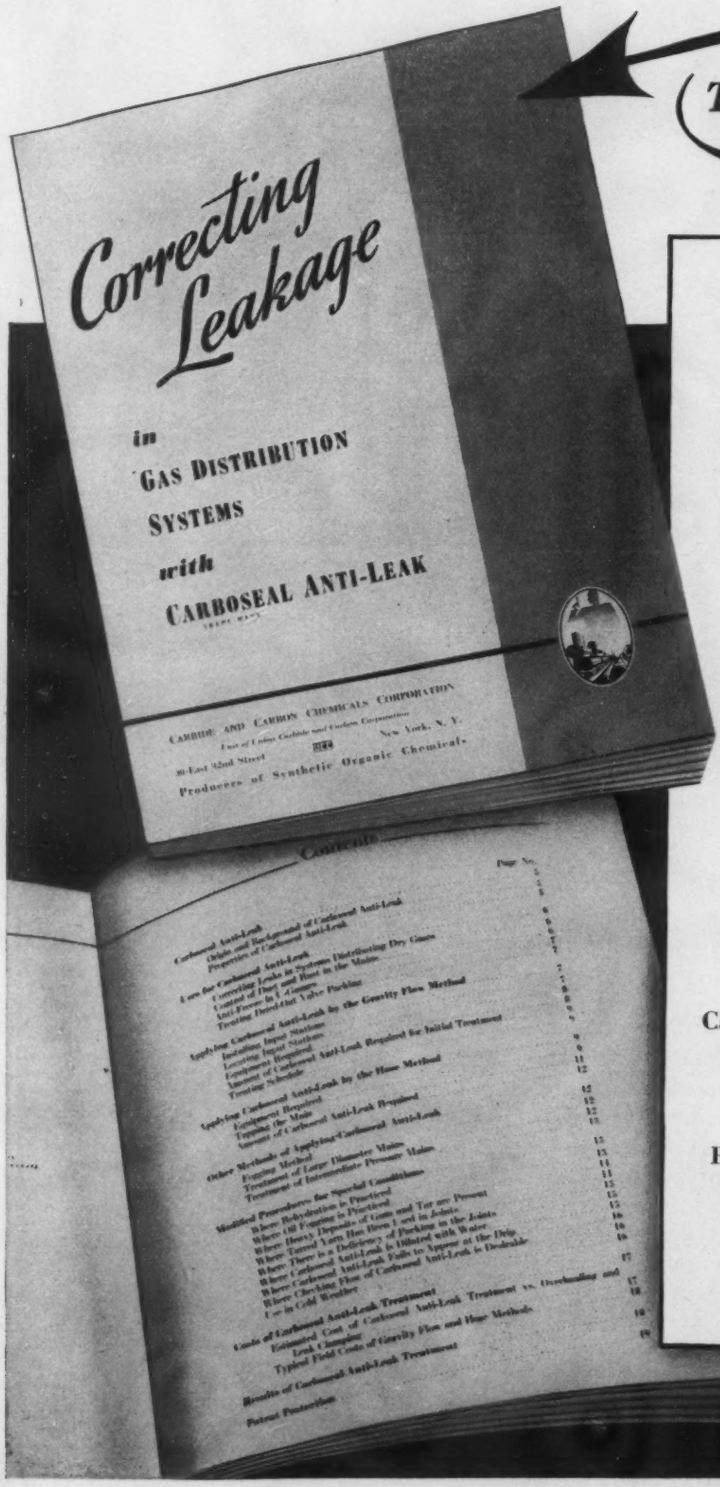
LEAKAGE in Dry Bell-and-Spigot Joints can be corrected at LOW COST!



This New Book Tells How!

THIS book is full of information about "Carboseal" anti-leak, the scientifically developed liquid for correcting bell-and-spigot joint leakage in distribution systems carrying dry manufactured or natural gas. It incorporates in compact form all the essential facts about "Carboseal" anti-leak, the methods of application, comparative costs, and results obtained.

The use of "Carboseal" anti-leak has now become a routine procedure in the maintenance programs of 250 gas companies. Their experience indicates that the average cost of "Carboseal" anti-leak is $90 per mile of 3-in. equivalent main.

Send for this book. Possibly this inexpensive and economical method of correcting joint leakage can be used to advantage in your system. A request on your company letterhead will bring you a copy, without obligation.

The word "Carboseal" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

Carbide and Carbon Chemicals Corporation
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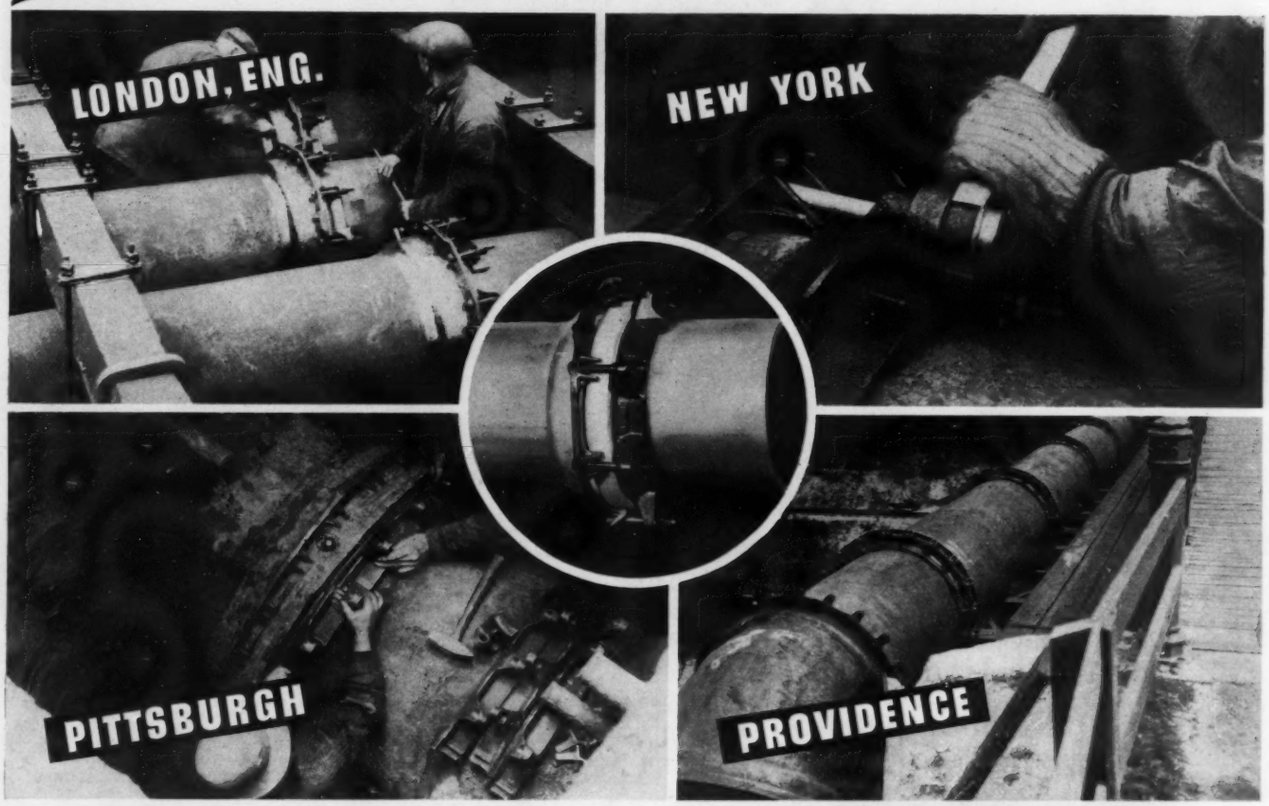
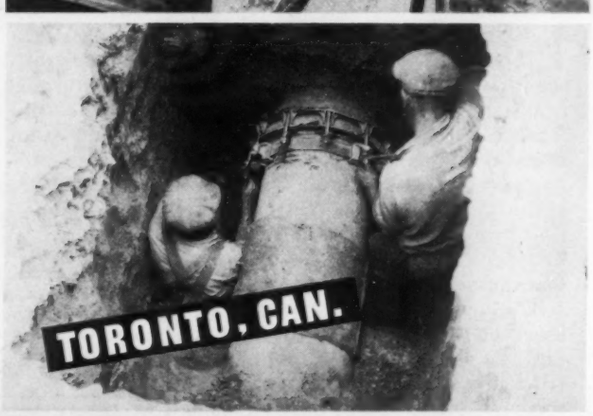
Producers of Synthetic Organic Chemicals

Six Pictures

AND THE STORY THEY TELL



On this page you see six pictures—five of them views from large cities, and the sixth a Dresser product. • The story they tell is simply this. Major cities, with engineering staffs and standardized practices, test carefully, check thoroughly before buying. Thus, any product that wins their approval has to be good. • Dresser Style 60 Clamps have been tested and "O.K.'d" by city engineering departments practically everywhere. Send for folder No. 3612-G today.

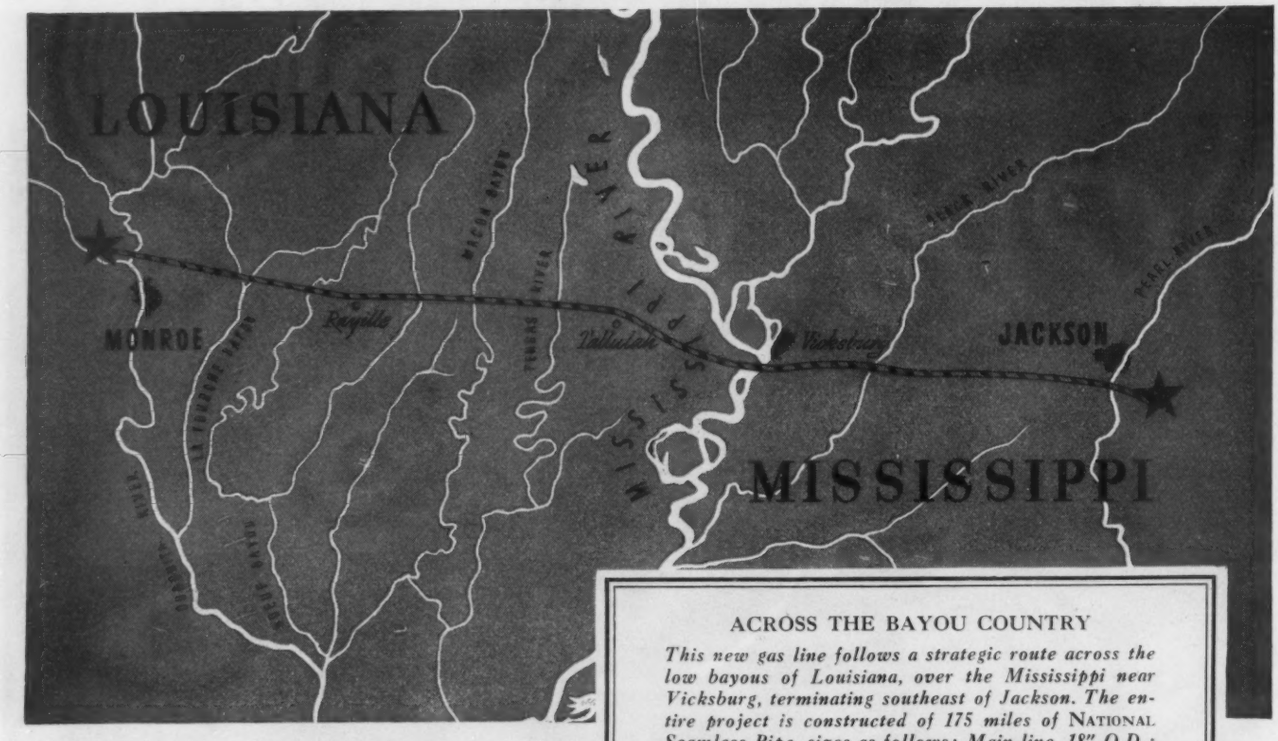


DRESSER BELL JOINT CLAMPS *Style 60*

DRESSER MFG. COMPANY, BRADFORD, PA. *In Canada:* Dresser Mfg. Company, Ltd., 60 Front St., W., Toronto, Ont.

175 More Miles

OF "WALLS WITHOUT WELDS"



ACROSS THE BAYOU COUNTRY

This new gas line follows a strategic route across the low bayous of Louisiana, over the Mississippi near Vicksburg, terminating southeast of Jackson. The entire project is constructed of 175 miles of NATIONAL *Seamless Pipe, sizes as follows: Main line, 18" O.D.; Gathering lines, 4" to 20" O.D.; Highway and railroad crossings, 22" O.D. casing; River crossings, 10¾", 12¾" and 14" O.D. In all, this important gas line includes twelve major river crossings.*

New Trunk Line for United Gas Pipe Line Company... ALL NATIONAL SEAMLESS

FROM the rich gas fields of northern Louisiana to the markets of southern Mississippi, Alabama, Florida, and Louisiana, gas is now flowing through America's newest major pipe line. It is one of the few large-diameter lines to cross the Mississippi River south of St. Louis, and its successful completion proves that even the formidable "Father of Waters" is no bar to gas transmission via pipe line.

The selection of NATIONAL Seamless Pipe for this entire project, including the 123-mile 18-in. O.D. main truck line from the vicinity of Monroe, La., to a point near Jackson, Miss., as well as gathering lines and casings, is a good indication of the standing of NATIONAL Seamless with pipe line engineers, and industrial men in general. You'll find this pipe used in important lines everywhere.

Here are reasons why NATIONAL *Seamless stands so high:*

First of all, it's good pipe. NATIONAL *Seamless is pierced from solid billets of highest quality steel. It has no welded seam—no line of potential weakness. This pipe gives you uniformly high wall strength—a factor of vital importance in pipe lines designed for high-speed, high-pressure transmission of gas, oil, or gasoline.*

Second, National Tube Company is headquarters for good service. As the world's leading producer of steel pipe and tubes, National can meet your requirements speedily, efficiently, exactly as you desire. No order is too large or too small to receive the same efficient handling. National's engineers have worked with prominent contractors on so many projects under all conceivable conditions, that they are able to help in many ways to keep the job going smoothly.

• • •

Good pipe and good service—that's why NATIONAL Seamless Pipe has figured prominently in virtually every important pipe line project of recent years. Don't miss these important advantages.

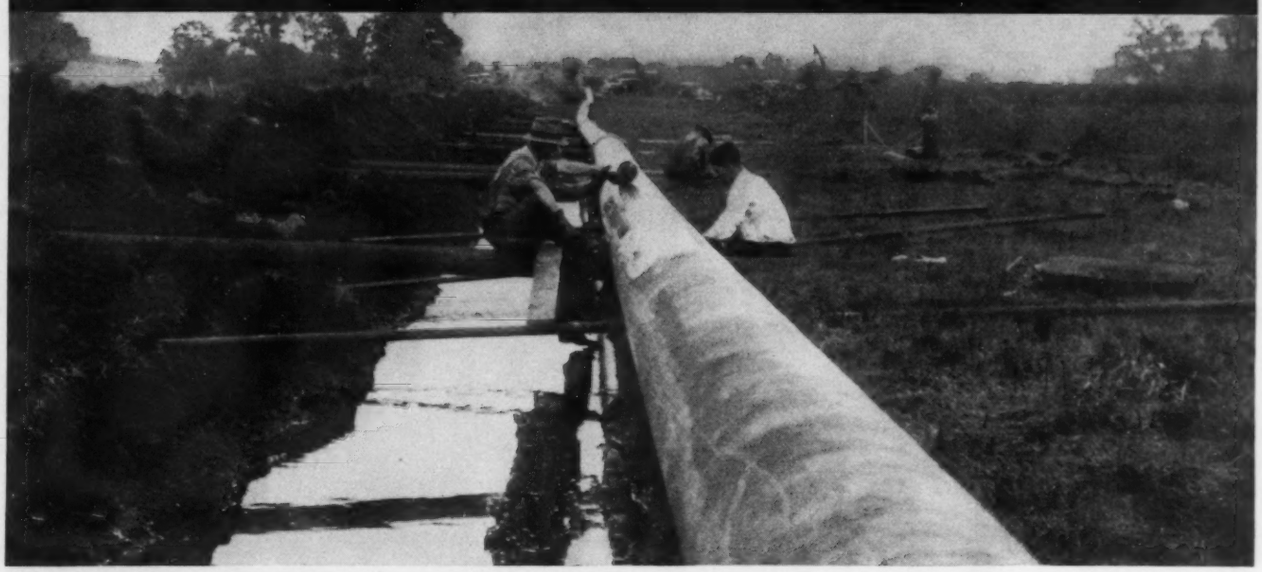
NATIONAL TUBE COMPANY

PITTSBURGH, PA.

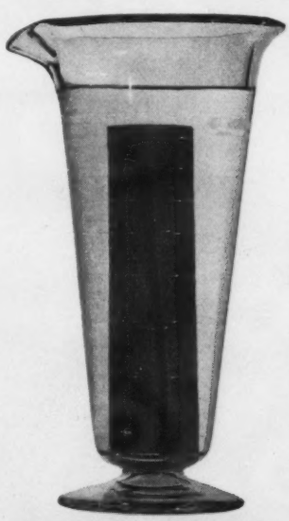
Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

For Positive Underground Protection "WATERPROOF YOUR PIPE"



After Seven Days in Water, NO-OX-IDized Wrappers Retain Their Moisture Resistance



Actual tests in independent laboratories show that new NO-OX-IDized Wrappers maintain their dielectric strength—and hence their moisture resistance—under the worst possible conditions. At the end of seven days' immersion in water, the No. 4 NO-OX-IDized Reinforced Fabric Wrapper withstood 2090 volts, No. 5 Dielectric Wrapper resisted 7140 volts, No. 7 Reinforced Asbestos Wrapper resisted 2590 volts, and No. 8 Single Membrane Wrapper withstood 2450 volts.

Other wrappers failed to resist 500 volts after only a 24-hour immersion!

"Regardless of the theories of corrosion, it is certain that if all corrosive agents are definitely and permanently cut off from the metal, corrosion cannot occur. *The problem, therefore, is one of waterproofing the pipe.*" So states Carl R. Weidner in a paper read before the American Petroleum Institute.

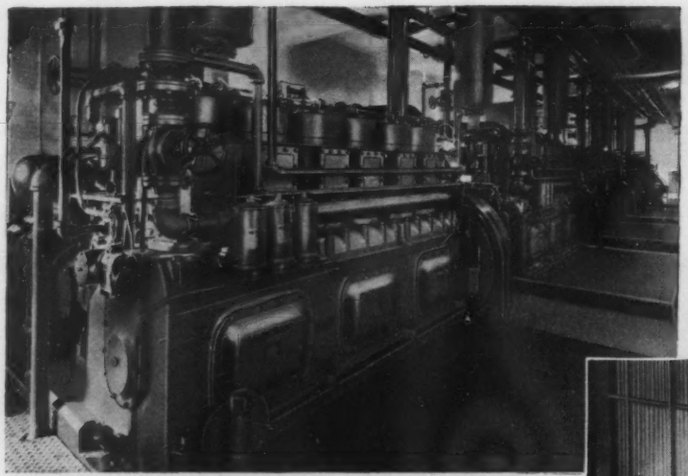
NO-OX-ID and NO-OX-IDized Wrapper Combinations are designed to "waterproof the pipe." NO-OX-ID is naturally water-repellent. Now, new NO-OX-IDized Wrappers have been developed with greater moisture and bacterial resistance. These new wrappers are also reinforced to resist soil action. In addition, NO-OX-ID Combinations contain active chemical inhibitors, which render passive any pits or corrosion that may already be present when the coating is applied. For lasting pipe line protection, waterproof your pipe with a NO-OX-ID Combination.

Dearborn Chemical Company
Dept. B, 310 S. Michigan Ave., Chicago

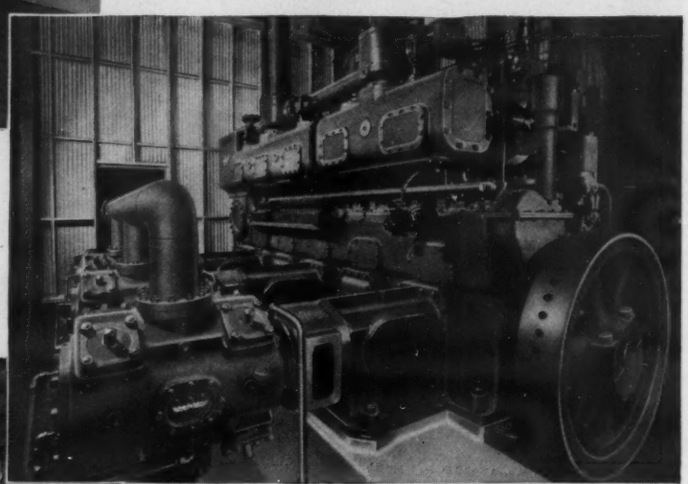
Write for questionnaire to get recommended NO-OX-ID Specifications

WORTHINGTON GAS ENGINE COMPRESSORS

A Size and Type for EVERY SERVICE



TYPE LCE...medium size, self-powered, simple and compact air and gas compressing units. Sizes 75 to 300 horsepower.



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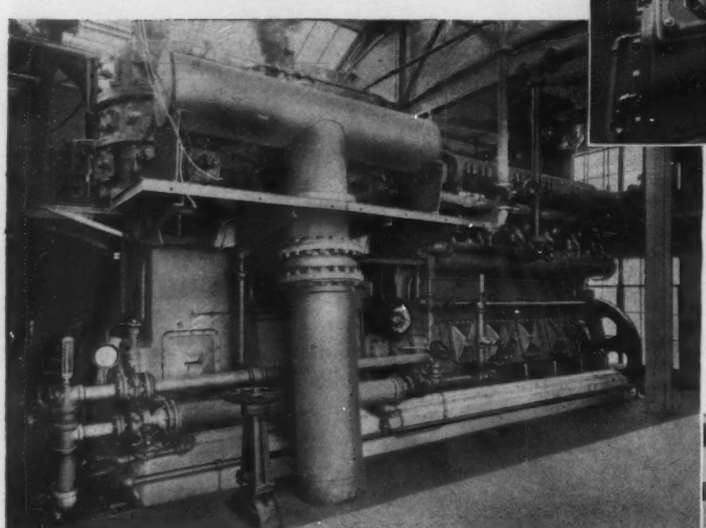

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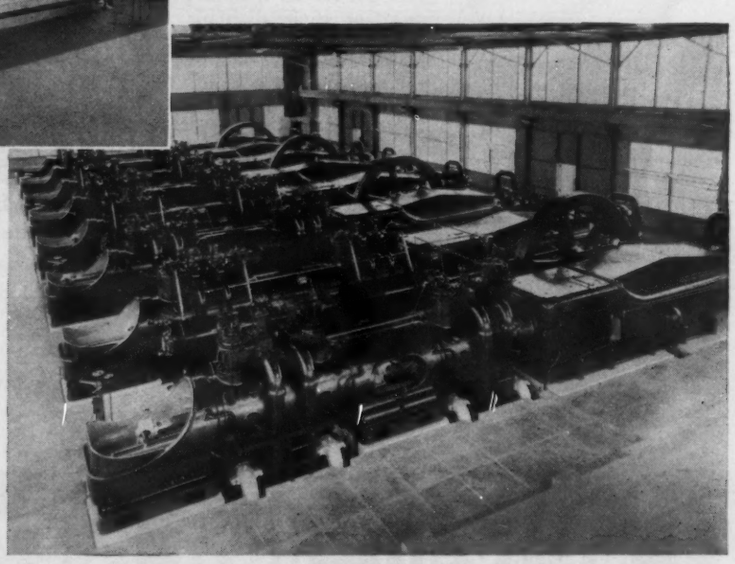

HORIZONTAL DOUBLE-ACTING FOUR-CYCLE UNITS... for heavy-duty main line compressor service. Sizes 680 to 1300 horsepower.

More Than Half a Million Horsepower in Operation

GCO-3

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When you need pipe for a hurry-up line project, remember..we can deliver
REPUBLIC ELECTRIC WELD LINE PIPE
faster than you can lay it
Northern Natural Gas Co. 16-inch line from Sioux City, Iowa to Minneapolis, Minn. A large section of this project was Republic Electric Weld Line Pipe.

Republic Electric Weld Line Pipe—Clean Inside—No Scale—Round—Uniform in Wall Thickness—Welds Readily—and Comes in Long Lengths.

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❶ Thoroughly clean pipe joint with wire brush. If lead is recessed back over 3/16" from surface, fill recess with plaster or cement.

❷ Clamp anchor ring on bell loosely. Fit gasket around spigot at joint, cutting off gasket end if necessary. (Keep clean.)

❸ Fit Monel Band around gasket. Assemble main ring over spigot with wedge lugs. Tighten wedge lugs thoroughly.

HOW TO STOP BELL JOINT LEAKS---INSTANTLY-the quickest way-the SEALED way!

★ In the **SKINNER-SEAL** BELL JOINT CLAMP the gasket is completely SEALED at the bell face by a Monel Metal Band—and at the pipe by a hard vulcanized tip which acts as a plug. SEALING in the pressure—SEALING out air, moisture and bad soil conditions.

Clamp adjusts automatically to all normal variations in pipe sizes—which cuts down the number of clamps you have to carry in your store room. And speedy one-man application cuts job costs to the bone.

Write today for prices and catalog. Large stock enables Skinner to ship 99% of orders the day received!

SKINNER-SEAL BELL JOINT CLAMP MONEL METAL BAND SEALS GASKET

❹ Thoroughly soap gasket, spigot and face of bell with very heavy soap-water, to eliminate friction.

❺ Slide main ring over gasket and Monel Band. Insert bolts and pull up all around with finger tension.

❻ Tighten anchor ring thoroughly; then tighten pull bolts uniformly all the way around—a turn at a time.

M. B. SKINNER CO. *Est. 1898* SOUTH BEND, IND.

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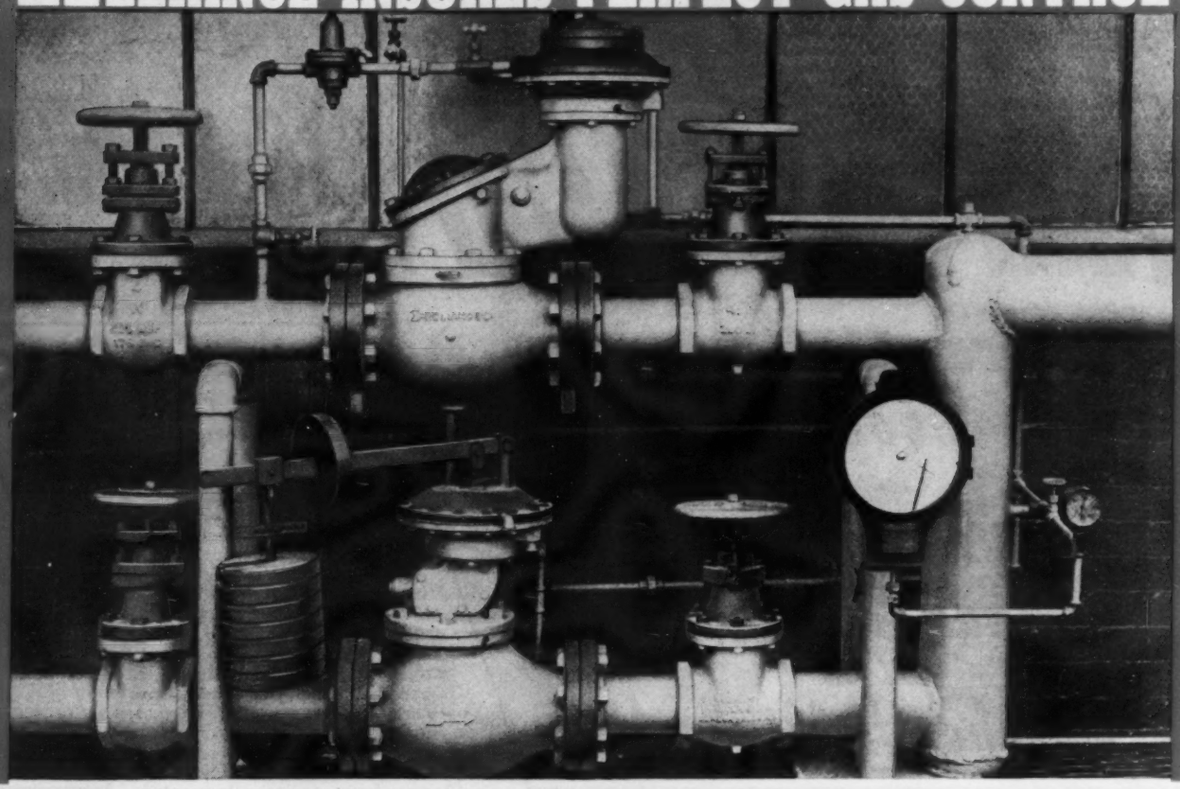

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Your distribution lines fan out to a multiplicity of remote points. At every point—beyond every meter—there is a potential hazard of loss and service expense if your regulators are not absolutely reliable.

Reliance Regulators are designed and made to eliminate troubles beyond the property line. With clean gas, they provide uniform outlet pressures with variable inlet pressures and variable load demands. They do it under wide fluctuations of temperature. They improve customer relations.

Size for size, a Reliance Regulator has more capacity—at uniform outlet pressure—than any other regulator.

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★ Promote Consumer Good Will
and
★★ Appreciation of Gas Service
plus
★★★ Merchandising Profit

★ Universal Gas Ranges promote consumer good-will because they guarantee a new and higher standard of automatic performance in all phases of cookery—success is an assured result.

★★ Universal promotes a new appreciation of gas service because it renders a performance that is new and entirely different from anything the consumer has ever experienced before. Universal elevates gas service to a new plane of convenience and modernity.

★★★ Universal, with its balanced line, promotes merchandising profit because the sales emphasis is placed on performance and service rather than on price. Practically every utility company that has featured Universal Gas Ranges has automatically created a higher average unit price, with a consequent greater dollar profit per range sold.

1. TOP BURNER Simmer-Save Burners bring true controllability of heat to top-of-range cooking—thereby eliminating all the objectionable features formerly associated with top burner cooking.

2. OVEN The Universal Draftless Precision Oven features complete automatic controllability of temperature, as well as heat distribution, assuring positive, uniform heat maintenance in every section of the oven—thus making possible the baking of four perfect cakes at one time without any shifting or attention.

3. BROILER The In-A-Drawer Broiler with Savory Smoke-Proof Broiler Grid, brings a new advance to the art and method of broiling. It definitely eliminates smoke and removes all hazards from broiling. Actually, it makes broiling one of the easiest and simplest methods of cooking. Universal emphasizes the natural advantages of gas for all broiling purposes.

UNIVERSAL

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★ ★ ★ ★ ★ ★ GAS RANGES

GAS
JUNE, 1940

GUEST Editorial

A Challenge to the Imagination

By JOSEPH BOWES

President, Oklahoma Natural Gas Company

EVERY year records new accomplishments by the gas industry; and every accomplishment challenges us, who are a part of this industry, to new achievements. The gas industry, though old as compared with some of the more modern sciences, is ever new because of the many interesting vistas which are opening to its services.

In recent years, we have watched the rapid strides which gas has made and the acceptance it has attained as the perfect fuel for house heating. Here in the great Southwest, especially, there is scarcely a house which does not use gas as the sole means of heating. Because of its dependability, availability, and adaptability, and because it requires no costly storage, every hotel, office building and commercial establishment is interested in our fuel as the ideal means of heating.

Industry, too, has found in gas an increasing number of advantages — its easy control, its uniformity of heat, its ready application to every process is winning converts daily. There is boundless scope for our enthusiasm for the future in the widening utilization of natural gas in the industrial field.

We, in the natural gas area especially, have watched the interesting development of the gas engine as a prime mover; and have been gratified by the growing list of users, large and small, who have purchased gas engines for running compressors, oil field equipment, and machines of various kinds. Where electricity seemed to be the logical medium for a certain process, we installed gas engines to generate that power, and a new field was opened to our industry.

We are all anxious, of course, to achieve perfection in our own industry, and one of the things to which we are now devoting our energies is the filling in of the valleys in our load curve. In areas where there is a large winter load, naturally the summer drop in use challenges us. And here at our door is a new and entirely untouched field which offers us the answer to our needs — summer air conditioning. For the past few years, air conditioning has intrigued householders and business men alike; but even yet, there is much to learn about it. However, it does seem now that air conditioning has become generally accepted, even demanded, by employes in office buildings and customers in downtown stores. During the pioneering period, the gas industry has not been asleep, but has been slowly and carefully perfecting and checking equipment. Now, as we face the future and stand at the threshold of this tremendous market, we find our gas equipment is ready and we in the gas industry can offer the ideal system for air-conditioning needs.

But even that is not all; for facing us, too, is the growing use of gas for chemical processes—the carburizing of steel; and the transformation of gas itself into other chemicals such as chloroform, methylene chloride, glycerine substitutes, etc. Gas, too, can be polymerized to make light oil, ethylene, acetylene, and tar.

Yes, the gas industry does challenge our imagination; and, far from glorying in its past accomplishments, we should take heed of the future and realize that the surface has only been scratched, and that each new year will add romance to the story of our industry.

• the beginning of a performance record

The industry's predominant use of American Meter Company meters is of course based essentially on their performance records. • And these quality standards . . . made possible through progressive experience of more than a century in gas meter development . . . are insured only by the rigid laboratory control and precision methods maintained throughout every operation and stage of manufacture.

THERMALLY *thinking*

Gregarious Gas Men

We pointed out in an editorial in the May issue of *GAS* that in our opinion the gas industry is afflicted with a bad case of conventionitis, or acute enlargement of the gregarious instinct. We invited comment, and we are getting it. So far the orchids have predominated, but we are expecting a dead cat to sail in through the window at any time. If conventions and conferences have become so sacrosanct that they can only be discussed in hushed and reverent tones, it is time somebody in the industry turned loose a healthy and realistic squawk.

Just to freshen up our recollection of the time spent in the endless pilgrimages to these various conclaves, we surveyed the record for 1939 as reported by the trade press of the industry.

We found first of all that a total of 46 conferences and conventions had been held in the United States during the year, and that the scheduled programs consumed a total of 111 working days. Allowing a half day each way for delegates going to and coming from (or coming to after) each convention, and we have blacked out 157, or approximately one-half of the total number of working days in the entire year.

This number did not take into consideration any of the innumerable committee meetings, air conditioning conferences, welding schools, measurement courses, hotel shows, metal congresses, safety councils, and home service training schools, all of which draw in a greater or less degree on the gas industry for their attendance.

It is probably safe to assume that very few of the 46 formally scheduled conventions or conferences registered an attendance of less than 200. As a matter of fact, for the 10 whose attendance records were printed, the average was 696. These varied from the Northwest conference of the Pacific Coast Gas Association with 83, to the annual convention of the American Gas Association which chalked up 3350.

But we will make our mistakes on the conservative side and eliminate the mass mobilization of the A.G.A. from our figures, which still leaves us an average reported attendance of 402. That number times 157, or 63,114 man days, is the convention total in time consumed alone. Any accountant can multiply this by the cost per man in salary, traveling expenses, and incidentals, and he will arrive at something approximating what the industry puts out annually for this activity.

We do not assail all conventions; nor do we imply that any one is not productive of some benefit. But we reiterate our position, that the time has come to re-evaluate our whole convention technique. We need the educational benefits of group discussions of common problems — but we don't need to go on forever playing the role of God's gift to the hotel trade.

Selling Features

Every writer, from the piping poet to the thundering propagandist, has within reach of his typewriter at least one book in addition to the dictionary — it is called Roget's International Thesaurus of English Words and Phrases. Its usefulness lies in the fact, not that it defines the meanings of words, but that it suggests just the proper word to use to express the exact degree of meaning intended.

The New England Gas Association's new pocket volume, "389 Gas Appliance Selling Features," might well be termed the thesaurus of the sales vocabulary. It does not undertake to develop new sales features, but it does present in a most usable form the outstanding, tested and proven arguments for the superiority of gas fuel. So completely and simply is the little manuel indexed, a salesman could almost consult it under the prospect's very nose without losing his (or her) attention.

In compiling the book the Sales Development Committee of the N.E.G.A. has made a distinct contribution to selling literature in the form of a piece that deserves circulation throughout the entire gas industry.

Water Heating

With straight gas companies there is no pussy-footing on the subject. All automatic water heating is needed gas load. This condition holds true with most of our so-called combination companies, who have established the correct policy, that wherever gas service is available, only automatic gas water heating is promoted.

The point we raise is the degree to which it should be promoted. Last year, in our March issue, in one of a series of articles on load-building in the mass market, Stanley Jenks presented the case for a single-point (kitchen sink) type of non-pressure automatic

gas water heater. He pointed to the excellent load-building results achieved by two New England gas companies, the Blackstone Valley Gas & Electric Co., Pawtucket, R. I., and the Fall River Gas Works, Fall River, Mass., with an instantaneous heater. At the time the study was made, it was known that our electric competitors were literally going to town with an electric two-gallon, non-pressure automatic storage job. This has been confirmed by a reported 35.3% increase in electric unit sales during 1939, a large number of which were the single-point kitchen type.

In Europe, particularly in England, there are many thousands of such automatic gas water heaters in successful operation. There is a definite place for them in America, as the electric success amply proves. Why are they not being used outside New England? A prominent water heater manufacturer tells us that the gas companies don't want them, and he'll be hanged (he used the naughty word) if he'll stick out his neck and money until they are interested and willing to promote their sale. We agree with him. The initial move lies with the gas companies.

Are we to assume they do not want this partial, but interesting load?

We wonder how many gas men, who, like ourselves, begrudge the electric people even a pint of automatically heated water where gas service is available, saw an advertisement recently in the widely read picture section of the Sunday edition of the *New York Times*.

Beneath an illustration of a man washing at a washstand basin with a heater strapped on the wall alongside the basin, the advertisement reads:

> Imagine! Constant automatic hot water for only $19.75. Made by the makers of ..... electric refrigerators, ranges and large basement type water heaters, this little Model CH heater will give you two gallons of really hot water any time of the day or night that you need it. Genuine Westinghouse heating element and thermostat. Copper tank will never rust.
>
> No trouble to install. Free tools and all necessary fittings included. Just plug in any 110-AC light socket and you can heat enough water for dish-washing, shaving, wash-up, baby's bottles, etc., every 20 minutes. Guaranteed to fit any standard sink or wash basin. Sent on THREE DAYS' FREE TRIAL.

There are "Fifth Columns" even in the "War of the Fuels." The small electric single-point automatic heater is one of them.

Let's not act when it is too late.

Tiptoe Thru The Tulips

We yearn at times for the simple directness of the golden days of a decade or so ago before public relations became the delicate and considerate science that it has now grown to be.

Those were the days when a little matter of extending a gas main was purely an engineering problem, and the line which the crew had traversed looked like the end product of the blitzkrieg through the Low Countries. The Press was softened up occasionally by a good fellow named Al who kept a bottle of gin in the lower left-hand corner of his desk, and doled it out judiciously to newspaper reporters. Property owners along the right-of-way made their presence known only once a month when the bills were presented, and then they were expected to come a-runnin'.

Times have changed, and now Al is "our Mr. Fitzgerald, Vice President in Charge of Public Relations," and every employe of the gas company is a public relations representative.

Let us look for confirmation to an engineer's report of the extension of a 24-in. line through three New Jersey towns, as presented by H. W. Nicholson of the Public Service Electric & Gas Co., in the *New England Gas News*:

> "Emphasis was placed on the neatness of the job and consideration of the public and property owners. Sod was carefully cut and stacked where we passed through sidewalk grass plots; canvas strips protected lawns; all ditches through the towns were air tamped so there would be no settlement; street and sidewalk pavings were replaced at once . . . and the streets were swept and washed down with a hose."

Sweeping the streets and washing them down with a hose — not quite as picturesque perhaps as the asphalt Alps that once marked gas main extension routes — but a lot more pleasing to the citizenry. And that is public relations.

Surprise! Surprise!

We don't know what the forthcoming movie "Turnabout" is all about, but advance stills seem to indicate that it is going to have one of those hey-nonny-nonny kitchens that no man would dare sneak through without tux or tails; and to indicate luxury and refinement at its peak it will be equipped with a gas range and a gas refrigerator.

The A.G.A. advises gas companies to tie in with the local advertising for this production, converting their regular newspaper advertising to special ready-to-use newspaper mats available for the purpose.

This is a type of marginal promotion that has to be geared to the type of audience that the local playhouse draws. While there are undoubtedly many people who would be favorably impressed by a gas range that served as a background for Adolphe Menjou; there must be others who are not quite so naive. And in their eyes we do not believe the gas industry gains much by competing with bingo and free china as an adjunct to motion picture publicity.

As a matter of domestic principle we don't think it is wise for a housewife to be hanging around a cookstove with that "What life would be if only Adolph Menjou were here" vision in her mind, either. After all, when we go to the gas refrigerator bent on filching a cold pig's knuckle, it would only be confusing to have Carole Landis step out. Confusing — but interesting, of course.

THE NATURAL GAS INDUSTRY
One Hundred Years of Progress

By WALTER C. BECKJORD

President, American Gas Association

THE natural gas industry has developed into a gigantic unit in America's industrial progress and represents mass production on a large scale. About 12 years ago I predicted that greatly increased quantities of energy would be transmitted by long distance transmission mains, and now it is a fact that over 90% of the energy distributed in this country in the form of gas, is natural gas, and the quantity of gas distributed by the gas industry as a whole is approximately seven times that of the electric industry. The quantity of energy distributed in 1938 in the form of gas as compared to coal, oil and electricity is as follows:

Industry	*Trillion B.t.u.'s*
Coal	10,280
Oil	7,280
Natural Gas	2,477
Electricity	398

so it will be seen that coal distributed over four times as much energy as gas; oil approximately three times, and gas distributed about six and a quarter times as much energy as electricity. The quantity of energy distributed in 1930 was:

Industry	*Trillion B.t.u.'s*
Coal	15,300
Oil	4,582
Gas	1,430
Electricity	222

so that coal in that year distributed about ten and one-half times as much energy as gas; oil three and three-quarters, and gas six and one-half as much as electricity.

• • •

The utilization of natural gas in this country dates back to more than 100 years. It was discovered in Fredonia, New York, and on June 4, 1824, Lafayette on one of his trips to this country after the Revolution, was present at the ceremony to celebrate that event. It was first put into actual commercial use in 1840 in Centerville, Pa., to evaporate salt brine, and prior to that in Pennsylvania, it had been noted in a burning spring in West Virginia by George Washington about 1775.

• • •

The National Advertising Campaign, the development of the CP range, house heating and water heating equipment and the Servel refrigerator, have all been milestones in the forward march of the gas industry.

• • •

Comparing the advent of natural gas with other industrial enterprises in this country, the manufacture of artificial gas started in Baltimore in 1816, in Boston and New York in the 1820's; the steam railroad in 1827, and the electric industry did not start until the first Pearl Street station was built in New York City in 1882. The real development in natural gas did not come until well after the twentieth century, because its application in the early history was confined to areas close to where gas had been discovered largely in the search for oil.

• • •

The modern transmission line of today is an almost perfect piece of construction, subject to interruption only by floods and other catastrophes, and methods have been developed to provide safe service even over and above these hazards.

W. C. BECKJORD

MR. BECKJORD, president of the American Gas Association and vice president and general manager of the Columbia Gas & Electric Corp., New York, N. Y., was one of the keynote speakers at the 35th Annual Convention of the Natural Gas Section of the American Gas Association which was held in Houston, Texas, May 6-10, 1940. Mr. Beckjord's address, "The Natural Gas Industry — 100 Years of Progress," was a comprehensive historical review and compendium of comment on the growth of the industry. Excerpts from his address are offered herewith. — [Abstract by G A S.)

In the early days, natural gas was sold at very low rates, and in competition with crude fuels at bare bones prices. It has been a long struggle to obtain adequate rates from the customers in order to provide proper service, and also, the increased efficiency of utilization has made it possible to obtain higher rates in competition with low-grade fuels.

• • •

Natural gas is now available in 34 States, covering practically the entire area of the United States, save the New England States, part of the eastern Seaboard and the northwest Pacific States. The following table shows the miles of natural gas transmission and distribution lines in ths country:

Year	*Transmission*	*Distribution*
1933	78,200	92,800
1934	78,800	94,200
1935	79,600	95,400
1936	80,500	98,500
1937	81,600	183,400
1938	83,100	186,900

The study of the production and sale of natural gas over the years marks a tremendous growth. (See Table No. 1). Starting from a small beginning, it shows something over two trillion cu. ft. of gas sold for industrial and domestic use. The increase in peak loads has been tremendous. For the Columbia System alone during the coldest day (January 19, 1940,) the total combined sendout was approximately one billion cu. ft., and the greatest previous peak in 1936 was 750,000,000. This includes, of course, some added territory served, but also illustrates the house heating business has come to be of great proportions.

• • •

The statistics (Table No. 2) supplied by the Bureau of Mines from 1906 to 1938, show an interesting development in natural gas rates. This table showing average price for all industrial uses includes carbon black manufacture, which sells at a very low price (between 1c and 2c) per M, and distorts the figures somewhat. The comparison of natural gas com-

TABLE NO. 1. NATURAL GAS INDUSTRY IN UNITED STATES (1906-1938)

Year	*Consumption M c.f.*	*Year*	*Consumption M c.f.*
1906	388,843,562	1922	762,546,000
1907	406,222,119	1923	1,008.135,000
1908	402,140,730	1924	1,141,521,000
1909	480,706,174	1925	1,188,439,000
1910	509,155,309	1926	1,312,853,000
1911	512,993,021	1927	1,445,248,000
1912	562,203,452	1928	1,567,619,000
1913	581,898,239	1929	1,917,451,000
1914	591,866,733	1930	1,941,644,000
1915	628,578,842	1931	1,686,436,000
1916	753,170,000	1932	1,555,990,000
1917	795,110,000	1933	1,555,474,000
1918	721,001,000	1934	1,770,721,000
1919	745,916,000	1935	1,916,595,000
1920	798,210,000	1936	2,167,802,000
1921	662,052,000	1937	2,408,000,000
		1938	2,263,000,000*

*Estimated.
Statistical Department, American Gas Association, February 16, 1940.

pared to manufactured on the basis of heat units is 35c for natural gas and $1.90 for manufactured, while the equivalent in the form of electrical energy is $6.82. This shows the great advantage natural gas has in supplying heat to industry, and with the greater efficiency developed, it should mean a big increase in industral applicatons.

• • •

In eastern Pennsylvania an entire steel plant has been converted to the use of natural gas in soaking pits, open hearth furnaces, rolling mills, cutting the 40-in. thick steel plate and other kindred uses. This company uses about 15 to 18 million cu. ft. per day, or between four and five billion per year. It is interesting to note this company uses as much gas approximately as the entire City of Washington does for mixing purposes, but with a demand of only about 60% as great, thereby illustrating the much higher load factor.

• • •

The great advantage that long distance lines have in the distribution of gas is due to the fact that the line can be packed up to a higher line pressure, thereby, storing great quantities of gas available for short-time peaks. The 1200-mile line to Detroit consisting largely of 22 and 20 in. pipe can store approximately 300 million ft. of gas, whereas, the maximum day is on the order of 200 million ft. This gives quite a leeway in meeting short-time peaks.

The growth of natural gas lines throughout the country has greatly increased the market for house heating gas, because the stored capacity for gas under high pressure in the transmission lines has made it possible to take care of house heating peaks with lesser proportionate investment than manufactured gas plants to meet this same peak, and by the reduction in cost of transmission capacity as the load develops to the point where lines are looped. This development, of course, has been made possible by development of house heating units of high efficiency.

• • •

We are now in the 124th year of the founding of the gas business in this country, and during that time the population has increased from something less than 10,000,000 people or about 4.5 persons per square mile, to over 132,000,000 or over 41 persons per square mile. We now have nearly 16,500,000 gas customers or 65% more than the entire population when it was started.

The earliest record in 1860 shows sales of about 4,000,000 cu. ft., whereas in 1939 there were 362,590,000 M c.f. of manufactured gas and a total of 2,263,000,000 M c.f. of natural gas sold. The peak year for manufactured gas was in 1929, 524,115,000 M c.f. sales, and 1939 was the largest in the natural gas industry.

• • •

There are 16,500,000 gas ranges in use, exceeding by over 2,000,000 the number in use in 1929. Over 1,500,000 gas refrigerators have been sold since 1929 and about 900,000 central-fired house heating jobs installed.

• • •

Like other industries, however, we must meet the ever-changing cycle by first finding new markets, and second by increasing the efficiency and adaptability of existing appliances. Air conditioning comes under the first heading and much constructive work has already been done, particularly in commercial application, but much remains to be done to increase the efficiency and reduce the installation cost for domestic installations. There is considerable engineering work to be done yet, and the problem is by no means a simple one. In my opinion air conditioning may well develop into a very desirable summer load, although it will by no means offset the winter house heating peak.

For the second item, increased efficiency of appliances, a great deal has already been done, but more can be done. There have been some very interesting developments in orifice application for top burners. The offset orifice developed on the Pacific Coast has been utilized in changeover operations with great success, and the Sebald orifice looks as though it had great possibilities. CP specifications for water heaters and house heating units are being studied, and it may well be they will equal the development in the CP range.

• • •

With all the competition we have in highly developed electrical appliances on the one hand, and mechanical equipment for using low-grade fuels on the other, a study of appliance sales shows the gas industry has held up fairly well, but a broader plan of dealer co-operation and time-payment sales will undoubtedly show results commensurate with the success some of our competitors have achieved.

• • •

The outstanding accomplishments of the last few years have largely been fostered in the activities of the A.G.A. National advertising has fulfilled a long-felt want. Approximately $500,000 per year is spent on this program and it is making the American public gas-conscious.

The CP range is an achieved fact, sponsored by the A.G.A. Committees and with the co-operation of the manufacturers. There are over 115,000 in service now, and fully that many more will be sold this year.

The A.G.A. Laboratories at Cleveland, have done an outstanding job not only in acting as the watchdog on safety of appliances, but in definitely improving their efficiency, adaptability and appearance. The efficiency of the top burners has been doubled and oven control and efficiency have been made almost perfect.

• • •

House heating which was formerly scoffed at as undesirable, dangerous

to load factor and to peace of mind on cold days, has been perfected until it is an accepted fact in new home design. Units are put in closets in small houses with no basements, and in some cases the cost of heating a home for a whole winter is less than $60 per year. It has filled a receding gap in the load curve due to changes in other classes of business, and some companies are holding their peak load at the same point after a 10-year period, thereby proving that house-heating has merely replaced other loads presumably lost or discontinued.

Refrigeration took 15 years of patient and painstaking effort, often against great discouragement, but now it is an accomplished fact not only in new business but in the replacement market as well. It took courage and initiative to put that across and the Consolidated Edison Co. of New York and the Servel Co. are entitled to the everlasting gratitude of the gas industry for carrying that job to a successful completion.

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The growth and development of the Servel refrigerator is a splendid example of what can be done in the way of new markets. Starting 15 years ago, with many difficult operating problems, it now represents about $102,000,000 of gross business, excellent load factor, which is on the order of 10% or more of the gross utility business.

There are now approximately 1,500,000 Servel boxes in service, or nearly 10% of the total gas customers, and while there were something over 12.000,000 electric refrigerators in use, sponsored by very powerful selling organizations throughout the country, the sale of Servel refrigerators for replacement is increasing right along, and this will most certainly increase our market as time goes on.

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Air conditioning is perhaps in the same position now as refrigeration was 10 or 15 years ago, but it is more of an engineering problem and the factors will have to be worked out with great care. It involves more engineering than any other utilization activity in our industry, and there has been a lack of comprehension of the problems involved, which has no doubt retarded the progress in this field.

We should properly define what air conditioning means, because there have been many misconceptions. Certainly, air conditioning should mean proper treatment of the air so as to have it drier in summer and contain more moisture in the winter than is generally the case. In the past three years the A. G. A. has had a committee of executives and a subcommittee of technical men working on this problem, and great strides have been made in conjunction with Dr. Young's activities in the Corey Hill Hospital in Boston.

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One thing I have been very much concerned about in my study of the statistics of the natural and manufactured gas industry is the constantly increasing ratio between investment cost and gross earnings. It must be realized that in building long distance transmission lines the investment is very large, and naturally most of the cost of transmission is fixed charges on the cost of the line.

The total investment in natural gas industry up to 1938 was $2,442,000,000; in the manufactured gas industry, $1,967,000,000. The total number of natural gas employes was 64,000, which means an investment of $38,153 per employe; whereas, total manufactured gas employes was 67,600, which means an investment of $29,105 per employe. This is an investment ratio of $5.39 per dollar of gross. The investment per employe in the natural gas industry is greater than any other except the electric power industry of $51,071, railroads being $23,390.

I would like to add a word of caution in respect to increasing investment, because over-expansion is a thing which ruins industry. No industry can stand a high investment ratio, and unless the turnover is rapid, it means stagnation and over-indebtedness. All new projects should be analyzed carefully to be sure there is enough new business in sight to support the transmission line, and it must be realized as a fundamental principle that no transmission line can exist purely on domestic business. The load factor of domestic business is probably less than 50% and with increasing house heating business with load factor of 25%, it would tend to reduce that still further. Summer load, air conditioning, and refrigeration help this, but it is essential to secure large volume dump or interruptible business which can be cut off the lines during peak load periods. It is obvious that present domestic rates could not be justified or maintained without the added increment profits resultant from the sale of large volume

TABLE NO. 2. AVERAGE PRICE OF NATURAL GAS IN THE UNITED STATES

(All Data in Cents Per 1000 Cu. Ft. of Gas)

Year	*Average Price For Domestic Uses**	*Average Price For Industrial Uses***	*(Excluding Carbon Black and Boiler Fuel)*	*Average Price For All Uses*
1906	22.7	7.8		12.1
1907	23.7	8.4		13.3
1908	23.6	8.2		13.6
1909	24.2	8.1		13.1
1910	24.4	8.6		13.9
1911	25.3	9.0		14.6
1912	26.3	9.1		15.0
1913	27.3	9.4		15.1
1914	28.0	9.6		15.9
1915	28.3	9.7		16.1
1916	28.6	10.2		16.0
1917	30.8	11.7		17.9
1918	31.4	15.2		21.3
1919	34.6	14.8		21.6
1920	38.2	17.0		24.6
1921	44.4	15.5		26.4
1922	49.9	18.6		29.1
1923	51.4	13.4		23.8
1924	54.0	11.6		22.2
1925	56.0	12.3		22.3
1926	58.4	12.8		22.9
1927	60.8	12.0		22.0
1928	62.0	13.0		23.2
1929	62.0	12.2	20.1	21.5
1930	63.5	11.3	19.7	21.4
1931	65.5	10.9	18.2	23.3
1932	69.3	10.0	17.3	24.7
1933	68.4	9.8	16.2	23.7
1934	68.6	9.7	16.0	22.3
1935	68.5	9.7	16.8	22.4
1936	67.1	10.0	16.5	22.0
1937	67.6	10.3	17.2	22.0
1938	68.0	9.9	16.7	22.1

**Industrial uses include gas used in field operations (drilling oil and gas wells, pumping oil and gas and operating gasoline recovery plants), petroleum refinery fuel, carbon black manufacture, electric public utility power plants, Portland cement plants and for other industrial purposes.

Source of data: U. S. Bureau of Mines, A. G. A. Statistical Department, April 30, 1940.

industrial gas sales which must be sold at competitive prices.

Of necessity rates for this type of business must meet competition, but we must emphasize more the necessity for increasing the efficiency of natural gas-burning appliances particularly the industrial and large commercial units, in order to justify as high a rate as possible for the gas. An increase of just a few cents in natural gas rates will more than compensate for expenditure in research.

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Since the utility industry is a natural monopoly, the question of regulation has been important in its progress and growth, and generally speaking, the industry has expanded under regulation, but some of the rate problems are very complicated. In general, the rates charged for gas utility service have been constantly decreasing over the years, and the actual cost of gas is a relatively small part of the total household budget. However, the utilities have been under pressure for many years past, not only from regulatory activities, but from the question of competition as well. It is my belief, that competition is the more important factor of the two. If a gas company cannot meet competition, it simply does not get the business.

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From the utility standpoint, we have always rendered more than adequate service to the public at reasonable rates, but it seems to be difficult to convince the public of this fact. Perhaps we have not tried hard enough to promote the idea that we are rendering adequate service at reasonable rates because we have been too busy with our other problems of production, distribution and sales.

We may not have the romance of the moving picture and the radio, but we are performing a useful public service and our record for continuity of service is unexcelled anywhere. It seems to me our principal problem today is that of sales, and it has been since time began. We must remember that, after all, the customer is the one to be suited and all our energy must be bent to that end. The old idea of come and get it, which may have been the tradition of some industries in this country some years ago, is long since gone by and we must now — because economics is more clearly in the minds of the public today than it ever was before — go out and tell our story — that we can accomplish the job better and cheaper than our competitor.

As an example of what can be accomplished by intelligent, well-directed, aggressive sales methods, coupled with reductions in rates due to introduction of natural and mixed gas, in a town of moderate size, I should like to show what has been done in Binghamton, N. Y., in the past eight-year period. With a reduction of about 30% in rates, this company has shown an increase in customers of 15%, an increase in therm sales per customer of 72%, and an increase in appliance sales from $92,797 in 1931 to $192,352 in 1939, or from $3.85 per customer to $6.96 per customer.

During this period the company sold approximately 1500 house heating jobs, increased its sales of automatic water heaters from 335 per year to 639, which meant an increase in saturation of from 6.5% to 13.7%, and a saturation of 5.5% in gas refrigeration and 5.5% in house heating.

I would also like to show the results obtained in several small towns near the Hudson River in New York, in which natural gas has been installed. In the past five years there has been a phenomenal growth in that location of 500% in residential sales, 110% in gross earnings, with a reduction in rates of over 60%. This is a pretty good territory just outside of New York with present sales of nearly $53 per residential customer. The saturation for gas refrigeration is 9.5%, automatic water heating 21.3%, and house heating 14.3%.

Rockland Gas Co., Inc., serves the villages of Spring Valley, Suffern and Haverstraw, N. Y., and vicinity. The territory, within commuting distance from the metropolitan areas, was served by 540 B.t.u. manufactured gas until the summer of 1935, at which time natural gas was made available through the pipe line facilities of the Home Gas Co. The property has vigorously promoted the sale of all gas appliances. The marked reduction in the rate per therm opened up new uses for gas to existing customers and made possible the addition of many new customers. It reduced its rates 65%, increased gross sales 105%, and its net earnings 207%.

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The natural gas industry and the A. G. A. have fostered research along many lines — scholarships and gas measurement courses at the various universities, and they have stabilized the operating and metering conditions in the industry in many ways. There is more research to be done and the Laboratories at Cleveland with an investment of $500,000 have a splendid organization and are already doing valuable research work in the development of domestic appliances and industrial equipment, and are ready to do more as financial support is available. I would make a plea for more funds for applied research in the Laboratories with the feeling it will definitely increase the rates at which natural gas can obtain in the competitive markets.

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Research is being conducted for the development of heat and power from the solar system, by various universities, and also research work is being done in regard to the production of fuel from trees in the ultimate future. It is interesting to note this research is being fostered by a well-known natural gas producer. It has largely been the history of this country that we are apt to overdevelop various industrial projects and there is apt to be a big wastage of natural resources.

It would seem in the present state of things, with the thorough knowledge of economics which has been instilled into this nation during the last stormy period, that we should profit by the lessons of the past and conserve the natural resources for the future. To this end it would be sound economics to give serious consideration to the utilization of mixed gas in many of the long distance transmission projects, and endeavor to so arrange production and the acquisition of markets, so that there would not be too sudden a change in the production cost of gas over the years. In other words, as supplies of natural gas wane, it will be possible to step forward into production of manufactured gas without too much adjustment of rates. This is a matter I think all gas men, and particularly natural gas men, should give careful thought to, so as to conserve the finest fuel yet known to man as long as possible.

Natural gas has just taken its place in the larger industries in this country. Its standing is recognized by bankers and investors all over the country. Its credit rating is high; the energy, skill and resources of the industry are great; it has well-trained executives with far-seeing vision, fully capable of solving the problems involved, which can only mean a brighter future.

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The rise of the natural gas industry to its present high status seems to me one of the brightest spots in the industrial history of the United States. It is like a fairy tale come true. When one considers that in the brief space of time of which we have records for production and sales from 1906 to 1938, the sales of natural gas have increased from 382 million to 3¼ trillion, it is a remarkable development and a tribute to the faith, courage and ability of gas engineers and executives who have fostered this work through the years.

THE UNDERGROUND STORAGE OF GAS

• By S. A. CHADWELL, superintendent, Gas Control Department, The Ohio Fuel Gas Co., Columbus, Ohio.

THE use of underground storage will result in the following advantages in operation, both economically and physically.

1. Improved load factor.
2. Increased flexibility of availability and utilization.
3. Conservation of gas.
4. Fulfillment of purchase gas contracts.
5. Storage of horsepower.
6. Added assurance of continuity of service.

Underground storage permits the use of transmission lines during off-peak periods when those lines would not ordinarily be used at capacity to serve markets, thus increasing the load factor.

The problem of The Ohio Fuel Gas Co. was to make available a supply of gas to be delivered above the so-called base load, leaving larger Ohio wells close to the markets for last reserves. Additional drilling in Ohio for this needed gas would not only have involved a large investment, but also the operation in connection with these additional wells would have been much more difficult, complicated and expensive than storage operation. Because of the type of load to be furnished, these wells would, of necessity, have to be operated seasonally and even daily. Opening one or two valves in the storage projects makes available gas equivalent to perhaps 100 to 150 average Ohio reserve wells.

Experience in the past has proven that the periods of heaviest demand have been accompanied by severe blizzards and heavy snows, rendering highways and byroads impassable for well operators who depend on modern transportation, and resulting in the reserve gas being less effective in serving a rapidly increasing demand. Because of the simplicity of storage operation, this demand can be supplied as and when needed, merely by a telephone call to the compressor station operators who are on duty 24 hours per day.

Fig. 1 illustrates how the storage projects have been operated through a complete seasonal cycle, and shows how the gas has been made available to storage during the off-peak season and its utilization for markets during the heavy demand season.

It is estimated that The Ohio Fuel Gas Co., through the development and operation of underground storage, effected a saving of $2,250,000 in capital expenditures, exclusive of the investment cost of the gas placed in storage.

• While the underground storage of gas by injection from external sources has been practiced in a few scattered areas for many years, it has not come into prominence and under general consideration until recently. It now appears to be a generally applicable and highly desirable procedure from many standpoints, including those of some manufactured gas operators. Attesting to this wide interest, numerous papers on the subject were presented at the annual convention of the American Gas Association Natural Gas Section held at Houston, Texas, May 6-10, 1940. Excerpts from several of these papers are published herewith. Other references to the subject appeared in GAS in the articles, "Liquid Hydrocarbons From Recycled Reservoir Gas," by William H. Vaughan, July, 1939, p. 36, and "Natural Gas Is Restored to Depleted Oklahoma Sands," by Paul R. Taylor, Sept., 1938, p. 108. — (Abstracts by GAS.)

• By C. U. DANIELS, Oklahoma Natural Gas Co., Tulsa, Okla.

A SMALL structure, involving about 300 acres, located about 25 miles from Tulsa, was chosen as a reservoir in order that an experiment of gas storage could be conducted. Four wells had been drilled in the structure since 1933, which had an original total open flow of 24,339 M c.f. Two of these wells were dead by July of 1936, and production was discontinued on the remaining two near the end of the same year. The initial pressure was 560 lbs. and the abandonment pressure was 83 lbs. after a total of 510,000 M c.f. had been produced from the sand. Production was found at approximately 1750 ft. in this locality. The sand is approximately 45 ft. thick and the porosity is estimated to be 20%.

In 1937, the leases involved were acquired, three of the wells were plugged and a small compressor plant was erected for the purpose of injecting gas into the sand through the one remaining well. Storage of gas was begun in 1937, and, since that time, two cycles of injection and withdrawal have been completed.

The gas in reserve at the beginning of the project was purchased at 6 cents and injected gas has been purchased on a dump-load basis at 3 cents; thus, during the first cycle, the average cost of gas per M c.f. in the reservoir was slightly over 4 cents. All other costs of the project, including operation, maintenance, depreciation, interest, and taxes, amounted to slightly under 5 cents per M c.f. during this cycle. The total cost then was almost 9 cents per M c.f. However, during the second cycle, these same costs were approximately 2 cents, 3 cents, and slightly under 5 cents. This variation of unit costs is, of course, a result of the excess of withdrawal over reserve and injected volumes. Estimated future storage and delivery cost show that unit costs decrease as injected volumes are increased, and that the unit cost is barely under 6 cents when 100,000 M c.f. at 2 lbs. pressure base are injected and withdrawn annually. Thus, for the area in which the reservoir is located, it will be necessary to store 100,000 M c.f. or more each year for economical operation.

• By J. H. ISHERWOOD, executive vice president and general manager, North Penn Gas Co., Port Alleganey, Pa.

IN practice we have encountered very little difficulty in the use of the Farmington field area as a storage reservoir and while our operations have not been such as to permit storage in excess of 301 lbs., it is our belief that it will be as feasible to store gas at higher pressures.

It should be pointed out that this area presented particularly favorable conditions for storage. It is a well-defined dome structure and as mentioned above, is sealed on all sides by either faults or by salt water contact. Had it not been for the extensive drilling in this area, we would not have the information available that enabled us to determine that this was a desirable and feasible storage area. It is, of course, a considerable gamble to place gas in storage when you have no method of definitely determining that the gas can again be recovered. We now feel that we have passed the experimental stage insofar as the use of this area for storage is concerned. We have not as yet encountered any difficulty due to water encroachment on the area and our only problem would appear to be to keep all wells in the area tightly sealed.

You may be interested in how the problem of landowners' royalties was met in this situation. At first thought it might appear that it would be necessary to pay royalty as the gas was withdrawn from storage. Fortunately for our operations we owned in fee the oil and gas underlying the larger part of

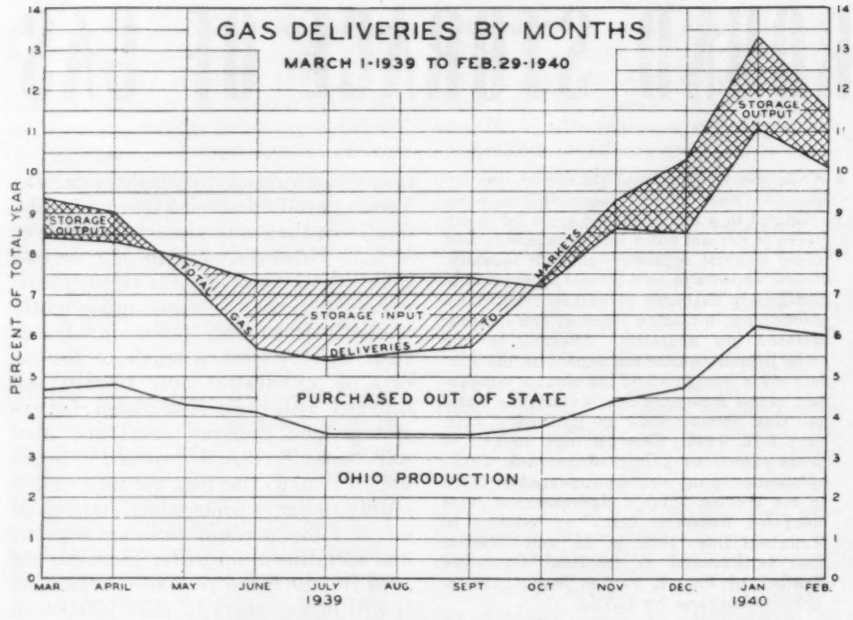


FIG. 1. Chart showing how The Ohio Fuel Gas Co. operated its storage projects through a complete seasonal cycle.

this area and in the case of our leases, we were able to agree with the landowner on a fixed annual rental for this use of his lease. We realize that this does not settle the question of whether or not the landowner would be entitled to royalty under these circumstances, but is only a practical solution which we reached in this particular situation.

In the future, we believe that being able to forecast our operations in the light of the use of this storage area, we will be enabled to operate our system with less available production than was formerly necessary to hold in reserve for peak demands. It should enable us to adopt a more uniform drilling program and production expense should be lessened by reason of the continued and uniform operation of our wells.

• By L. T. POTTER, Lone Star Gas Co., Dallas, Texas.

PRIOR to the beginning of storage operations in the Cheaney field, the wells had produced a total of 8,794,135 M c.f. of gas. It has been estimated that an additional volume of gas equivalent to about 65% of the previously mentioned measured production was produced from the field and wasted to the air in connection with the operation of the wells during the first few years of production.

The field was first utilized for gas storage in the month of April, 1935, at which time there were 15 gas wells remaining. All these wells were being operated continuously on siphon production into a field compressor station, and under this form of operation the wells, as a group, were producing gas at a rate of 1000 M c.f. per day.

The use of the Cheaney field reservoir for the storage of gas was conceived primarily as a result of the desire to prevent the waste of residue gas from the casinghead gasoline plants connected to our pipe line system.

The most pertinent point reflected by this particular experience in underground storage of gas in relation to the general problem is that of the time element. Regardless of the primary purpose of a storage operation, whether it be for the purpose of eliminating waste or for the purpose of bolstering transmission capacity, the relation between the time required to put the gas into the reservoir as compared to the time required to take the gas from the reservoir is of cardinal importance. Referring again to the field under discussion in relation to this time element, our experience may be summarized as follows:

Operation	*Number of Days Required*	*Average Daily Rate of Delivery M c.f.*	*Maximum Daily Rate of Delivery Attained M c.f.*
First Storage	197	3,960	4,955
First Return	615	1,500	1,990
Second Storage	119	3,430	4,227
Second Return	296	1,405	1,595

These data reflect the fact that, in the case of Cheaney field, the rate at which gas can be returned from storage is considerably less than one-half the rate at which gas can be put into storage. This relationship results from the circumstances influencing the operations in this particular field wherein the wells were necessarily operated with back pressure when gas was being returned from storage. There seems to be no doubt, however, that the same general condition will be found to exist to a greater or less degree in the use of any natural underground reservoir for the storage of gas, particularly if the reservoir has closely approached depletion before its adaptation to the storage operation.

• By F. H. FINN, geologist, The Peoples Natural Gas Co., Pittsburgh, Pa.

AS a result of the experience of the Peoples Natural Gas Co. and the New York State Natural Gas Corp., it has been found that the most effective storage for all practical purposes is in small pools where large open flow wells are available, thus resulting in high capacity to produce for a relatively small amount of gas stored. It is also considered important that the storage take place under conditions whereby the gas is pumped only one way, *i.e.*, either pumped into storage or pumped out of storage. Pumping of gas both ways increases the expense.

It is also important to consider the ability to withdraw the gas rapidly from storage in any undertaking of this type, as it is not economical to tie up large quantities of gas over a long period of time, since the interest on the value of the gas will over-balance the profit derived from the sale when the gas is needed.

It is believed that the most economical type of storage is that which can be made in pools which will hold from 500 million to 3 billion cu. ft. of gas at a rock pressure of not more than 500 lbs., and from which the gas can be withdrawn at a rate which will accomplish complete emptying of the storage in six months.

• By E. O. SCHILLHANN, geologist, The Manufacturers Light & Heat Co., Pittsburgh, Pa.

IN 1937 the Manufacturers Light & Heat Co. established two storage fields in southwestern Pennsylvania for the underground storage of gas.

Of a total of 22 wells in the first field, 12 of them, located on approximately 1300 acres, are used as storage wells. These 12 wells were reconditioned, tubed and packed above the sand prior to storage operations.

Approximately three-quarters of a billion cu. ft. of gas have been put into these wells with a total withdrawal of 15% of the gas stored. While both artificial and natural gas have been stored, over 85% has been artificial gas. A study of the B.t.u. values indicates that the gas withdrawn to date has been artificial gas.

The average rock pressure of the

storage wells since storage operations were started has been increased from 140 lbs. to 260 lbs. The 10 wells not used for storage surround the storage wells and are kept shut in for rock pressure study. To date no build-up in rock pressure on these outside wells has been recorded. The rock pressure of the 12 wells used for storage do not equalize even when the wells are shut in for extended periods.

The second field was established for the underground storage of natural gas. This field has some 57 producing wells, 25 of which are grouped geographically and joined by pipe lines so as to make an operating unit. Of these 25 wells, 18 located on approximately 2500 acres are used as storage wells. No reconditioning, other than bailing, was done prior to storage.

Approximately one and three-quarter billion cu. ft. of natural gas only has been put into these wells, with a total withdrawal of 5% of the gas stored.

The average rock pressure of the storage wells since storage operations were started has been increased from 105 lbs. to 175 lbs. The seven wells not used for storage are kept shut in for rock pressure study. To date no build-up in rock pressure on these wells has been recorded. The rock pressures on the 18 wells used for storage in this field do not equalize even when the wells are shut in for extended periods.

The failure of the rock pressures of the individual wells in both fields to equalize, even when these wells are shut in for extended periods, tends to indicate that the gas put into the wells builds up cones of pressure near the base of the wells. This, apparently, is due to the low porosity and permeability of the sands.

• By T. J. TONKIN, JR., vice president, Central Kentucky Natural Gas Co., Lexington, Ky.

AS a result of our storage operations in the Menifee field in Kentucky, we were made defendant in two suits. A state revenue agent sued us for omitted taxes on the value of the stored gas, and the owner of a small tract of land, which we did not have under lease, sued us for using his land as a reservoir without compensation. The latter case ultimately went to the Kentucky Court of Appeals, which court said that the stored gas should be considered as ferae naturae — anybody's fish that caught it — which effectively disposed of the suit for taxes, as well as the landowner's claim for compensation. See Hammonds vs. Central Kentucky Natural Gas Co., Ky. 255-685.

It might be of interest to state that during all of the years we had been operating in this field, there were one or two small tracts of land on which we had never been able to secure a lease. This did not particularly worry us, inasmuch as there was no available market for the gas should anyone else be able to lease and drill on these tracts. We were somewhat chagrined when another party did lease these tracts, drilled two or three wells, and set up a gas engine driven generator for the purpose of supplying electric current to several villages within a 20-mile radius. We feel that we are furnishing a dependable source of free fuel to this plant, but take some comfort in the thought that it amounts to only a few drops from our bucket.

• By P. D. MELLON, general superintendent and chief engineer, Canadian Western Natural Gas, Light, Heat & Power Co., Ltd., Calgary, Alta.

THE Bow Island gas field originally covered an area of 30 square miles and contained approximately 44 billion cu. ft. of gas.

Twenty-seven wells were drilled to the gas horizon in the Lower Colorado shales at average depths from the surface of 1800 to 2000 ft. The boundaries of the field were ultimately outlined on all sides by the drilling of either dry wells or those containing water. It was the sole source of supply for the gas company's main markets for 10 years when edge water encroachment reduced the area of the field to approximately 20 square miles. During this period 38 billion cu. ft. of gas was removed and there was left in the reservoir approximately 6 billion cu. ft., while the original rock pressure of 745 lbs. per sq. in. was reduced to 249 lbs.

It was realized that possibly not more than one-half of these wells could be used for repressuring purposes.

It was necessary therefore to examine each well thoroughly, a portable machine being used for the purpose. Ultimately all but 11 wells were permanently abandoned by cementing off all strings, while those to be used for repressuring were either tubed or repaired to eliminate the possibility of any migration of gas or water from one sand to another.

The exterior of each well used for repressuring was equipped with new fittings and orifice meters (see Fig. 2) while field lines were relaid and made tight by welding all joints.

From the commencement of operation August 3, 1930, to February 1, 1939, a total of 11,925,588 M c.f. has been stored. The cost of the plant and all operations during the above period has been capitalized as it was considered by the Provincial Utility Board and the company that the project should be treated in the same manner as the development of a new field. Therefore it has not to any appreciable extent affected operating expenses other than a small annual charge for amortization.

The average rock pressure of the field at commencement of operations was 249 lbs.; and on February 1, 1939, it was 565 lbs.; or an increase in rock pressure of 316 lbs.

The company feels therefore that the expenditure incurred has been justified.

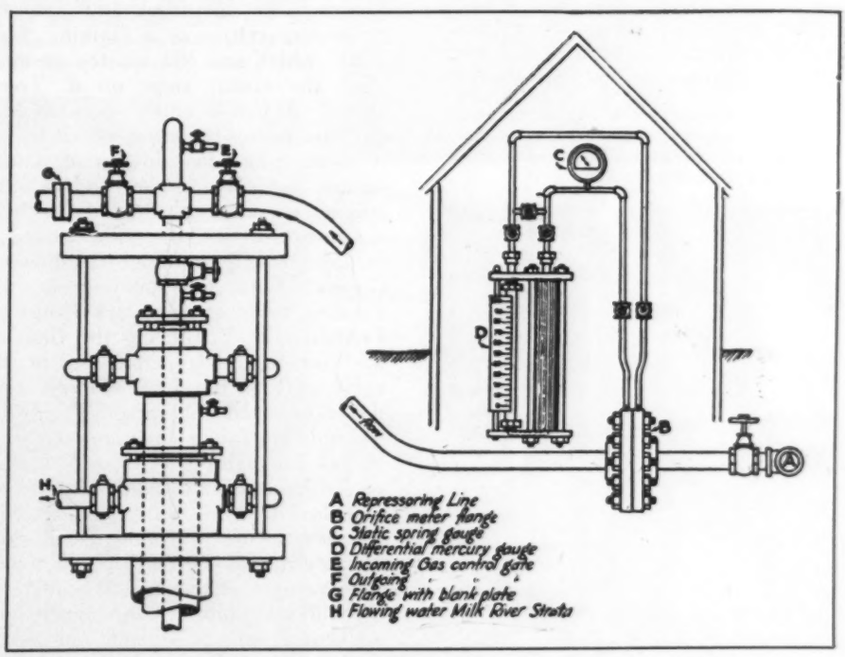

A Repressoring Line
B Orifice meter flange
C Static spring gauge
D Differential mercury gauge
E Incoming Gas control gate
F Outgoing
G Flange with blank plate
H Flowing water Milk River Strata

FIG. 2. Well hook-up used by Canadian Western Natural Gas, Light, Heat & Power Co., Ltd., Calgary, Alta.

A Trip to Gas Wonderland

ON THE opening day, May 11, of the 1940 New York World's Fair, more than 3600 persons per hour viewed Tiny Town, one of the high points of Gas Wonderland, the industry's new exhibit. Tiny Town is a complete suburb in miniature, with streets, trees, a church, motion-picture theatre, school, swimming pool, newspaper plant, hospital, candy factory, gas company office, shops, stores, and houses of various types and styles including the mansions of the well-to-do and the cottages of the wage earners and salaried people.

There are 21 buildings in Tiny Town which "talk" to visitors as their sides come down or roofs pop open to reveal interiors that disclose all the various utilizations of gas in the home, in commerce and industry. The buildings tell the visitors of the advantages of gas as a modern fuel.

Another proof of the exhibit's popularity was the fact that it was necessary to turn customers away from the Flame Restaurant, which has a capacity for seating 1000 persons indoors and approximately 600 out-of-doors either on a canopy-covered terrace or a tree-shaded patio. All the food in the popular-priced restaurant is prepared on gas appliances, the operations of which may be observed by the patrons.

One of the features of the exhibit which attracted the thousands of visitors was the Disappearing Dwarf, a real person of diminutive size who does a few tricks and then disappears. In the entrance pavilion are the "Magic Caves of Ice," an exhibit sponsored by Servel, Inc., where visitors viewed the icicle formations, frozen lakes and waterfalls, the Aurora Borealis of Polar regions, and in a series of 10 dioramas set in the cavern walls, learned the story of mankind's efforts to preserve his food through refrigeration. Refrigeration of less than a generation ago, when automatic refrigeration was in its pioneering stage, is depicted in a scene to indicate the progress made since then. Final dioramas show modern kitchens furnished with the most up-to-date appliances.

Visitors next came to the "mini" kitchen and stood in line to look at the latest gas appliances and kitchen furnishings through one of the 30 "peep" holes. As the kitchen is seen through "diminishing glasses" recessed within the peep holes, everything looks tiny. After seeing it in miniature, visitors are invited to go into the actual kitchen.

Adjoining the "mini" kitchen is the "mini" basement which also is to be seen through peep holes. In this room is displayed the house heating and air conditioning apparatus, as well as equipment for leisure time activities. The floor covering represents a sandy beach with a rippling wave effect at the edges and a starfish in the center.

In the Mystery Garden, adjacent to the entrance pavilion, opening-day visitors were surprised and amused by such novelties as a "talking flagstone" which says "Don't step on me" when the visitor steps on it. Trees "sing." A bench under an umbrella tree also begins to sing when sat upon. A cactus plant has flowers of flame, statues suddenly vanish, and talking gnomes peep out of the hedges.

Other new features of this year's exhibit include a diorama showing General Lafayette standing in the drawing room of the Clark House at Fredonia, N. Y., during the time of his visit to the United States in the early part of the 19th century. Fredonia is noted in the annals of the gas industry for its early use of natural gas for lighting purposes. A map of the United States made of terrazzo marble and laid horizontally in the Mystery Garden shows the distribution of natural gas in the United States. The various states are indicated by the different colors of the marble. Also shown here is a model of a gas well in Texas. Nearby is an operating model of a derrick like that used in natural gas regions. Also located in the Mystery Garden is a striking fountain combining gas flames of ever-changing color with tumbling water.

An auditorium with a seating capacity of several hundred situated in the building directly adjacent to the Court of Flame has been made available as a public service throughout the duration of the Fair to civic, welfare and other organizations who may desire its use for meetings. This auditorium will also be used by the exhibitors for meetings devoted to discussions pertaining to the gas industry.

The Court of Flame which gave the entire exhibit its name last year is still a feature of this year's exhibit group. The four 90-ft. red colored shafts or pylons appear as beacons at night as they are swathed in flame from gas jets ingeniously arranged to give an upward spiral effect to the flame. The gas flame torch continues to be a feature of the exhibit.

A new feature of the Court of Flame are the kaleidoscopic pools located beneath the central giant cube. In the pools large gold fish disport themselves. By means of reflectors and lighting devices these fish as well as marine plants at the bottom of the pool take on fantastic shapes and colors, the fish sometimes appearing with many heads and tails, and at other times headless and tailless.

The theme of the exhibit was originated by Richard Cecil Pond, director of displays of the advertising firm of Batton, Barton, Durstine & Osborn, who superintended the staging of the displays. Skidmore, Owings & Merrill are the architects; Burdette Baxter Gilmore, the design engineers.

On Thursday, May 9, Hugh H. Cuthrell, president of Gas Exhibits, Inc., the non-profit cooperative group conducting the industry's exhibit, and N. T. Sellman, president of the Court of Flame Club, were host to nearly 200 newspaper editors, magazine writers, radio commentators, and representatives of newsreel companies, broadcasting networks, magazines, and trade publications. Following an informal reception, the guests were given a preview of Gas Wonderland.

The board of directors of Gas Exhibits, Inc., sponsored on May 11, the opening day, a buffet luncheon for executives of the gas utility and manufacturing companies who have contributed to the Fair participation.

The Gas Industry's fire and water fountains which grace the entrance pavilion fronting the Avenue of Patriots, of the new exhibit at the New York World's Fair.

Tiny Town, a unit of the gas industry's exhibit group at the New York World's Fair, attracted many visitors on the opening day, May 11. Several of the miniature buildings pop open to demonstrate the various uses of modern gas appliances.

In front of one of the entrances to Gas Wonderland. Posters above the crowd refer to the "wonders" of the exhibit. Most of the features of this year's display are entirely new.

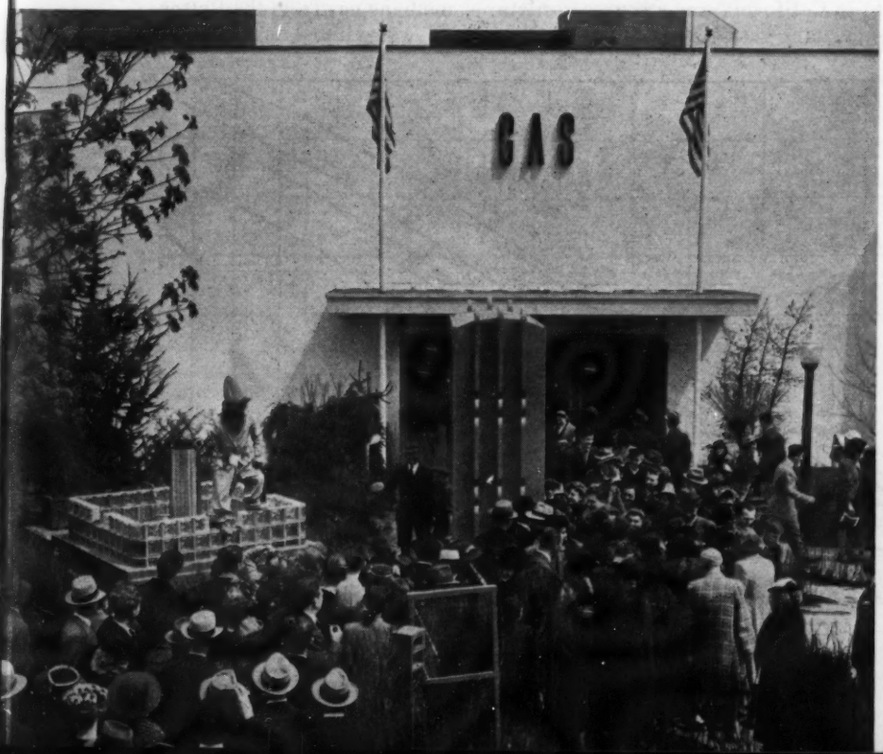
GAS Camera

• **GAS WONDERLAND, the industry's new 1940 exhibit at the New York World's Fair, draws huge crowds on the Exposition's opening day.**

Gas Wonderland's Mystery Garden as it appeared on the opening day at the New York World's Fair. Part of the crowd is being entertained by the disappearing dwarf, Gaso (at left), while others are amused by the trees that "sing" and the flagstones that "talk." One of the plants is a cactus with flowers of flame. In the background at right, people are passing through the entrance into Tiny Town.

E. F. Putnam, president, Greenwich Gas Co., and Mrs. Putnam, guests at the reception held at the Court of Flame Club, look at the completely gas-equipped "mini" kitchen through peepholes.

Present at a reception given the opening day of the Fair by Gas Exhibits, Inc., were (left to right): H. N. Ramsey, vice president, Gas Exhibits, Inc.; Clifford E. Paige, president, Brooklyn Union Gas Co.; B. G. Neilson, vice president, Brooklyn Union Gas Co.; N. T. Sellman, president, Court of Flame Club; and C. W. Berghorn, managing director, A.G.A.E.M., shown on the club's terrace.



THE HYDRATES OF

Natural Gas, Pure Gas, Synthetic Gas Mixtures

By W. M. DEATON† and E. M. FROST, JR.‡

U. S. Department of the Interior, Bureau of Mines, Amarillo, Texas

NUMEROUS ARTICLES on natural gas hydrates have been published during the past several years, and these are to be found in rather complete progression in the past issues of G A S. The articles that have been published have to a large extent dealt with practical field difficulties and ways and means of overcoming them, but such work has been somewhat retarded by lack of basic information on the chemical and physical characteristics of these hydrates. Investigators and operators in this field should therefore find considerable value and assistance in the data given herewith on pressure-temperature-composition characteristics of various gaseous mixtures and of pure gases. These data were taken from a paper, "Hydrates of Natural Gas, Pure Gas, and Synthetic Gas Mixtures," which was prepared for presentation at the Annual Convention of the American Gas Association's Natural Gas Section held at Houston, Texas, May 6-10, 1940. (Abstract by G A S.)

W. M. DEATON

E. M. FROST, JR.

THE hydrate characteristics of a number of natural gases have been determined.* Fig. 1 shows the hydrate decomposition curves for 12 natural gases and the curves for methane and ethane. The analyses of these gases are given in Table No. 1, which also includes analyses for the other gases considered in this paper.

All of the curves determined on natural gases lie in the region between the curves for methane and ethane. Curves for four natural gases — E, F, G, and H — are coincident throughout most of the range shown. It will be observed that the natural gases having a low nitrogen content and a high content of ethane and heavier gases form hydrates more readily. No simple relationship has been found that will enable one to predict the hydrate characteristics of the gas from its analysis. In a very general way, however, it can be concluded that high-B.t.u. gases will form hydrates more readily than low-B.t.u. gases. The hydrate data on natural gases plot as straight lines on semi-logarithmic paper. Breaks in the curves at high pressures and temperatures indicate that under these conditions hydrates differ somewhat from those at lower pressures and temperatures. To determine the exact nature of this difference more work must be done.

Hydrates of Pure Gases

Fig. 2 shows the hydrate-decomposition curves of several essentially pure gases. The carbon dioxide used was obtained from cylinders of liquefied carbon dioxide. Measurements of its vapor pressure at various temperatures indicated that its purity was essentially 100%. Gas obtained from the Buttonwillow field in California was a source of the pure methane gas. This gas analyzed 99.7% methane and 0.3% carbon dioxide. Tests were made with and without removal of the carbon dioxide, and no difference in the hydrate characteristics could be observed. The ethane used in obtaining the hydrate data analyzed 97%. Propane used in these tests analyzed 99.8%. Analyses of all gases reported upon here are shown in Table No. 1. Tests were made using both isobutane and normal butane, but no hydrates could be obtained at 32.5° F., even though liquefied butane in contact with water was subjected to hydrostatic pressures of 500 to 800 lbs. per sq. in. for an hour and more in each test. At 32° F. and lower ice was formed, but in our tests it was not possible to confirm the presence of butane hydrates. In tests with ethane and propane no difficulty was found with hydrates forming when the liquefied gases were in contact with water.

Hydrates of Mixtures of Gases

The hydrate characteristics of several mixtures of gases are shown in Figs. 3, 4, and 5. In making up the mixtures, methane gas from the Buttonwillow field was diluted with various

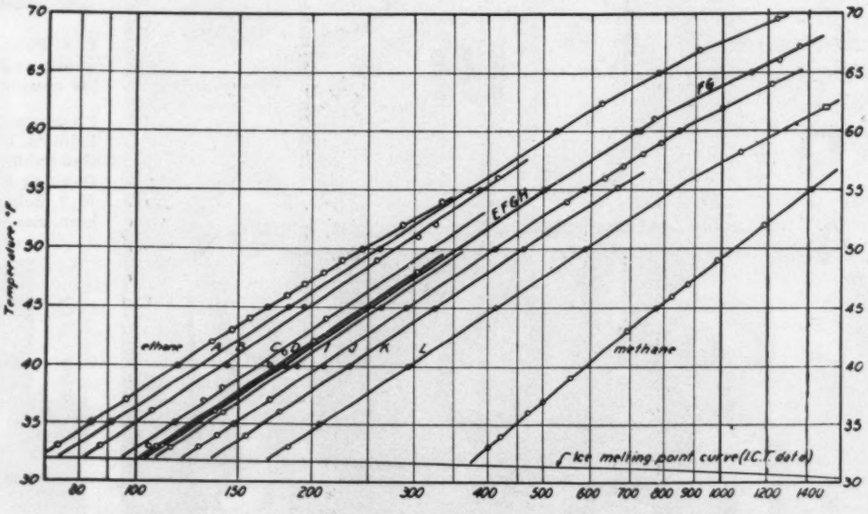


FIG. 1. Gas hydrate decomposition curves, natural gases. Letters refer to natural gases in Table No. 1.

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†Physical Chemist, Bureau of Mines, Petroleum and Natural-Gas Division, Amarillo, Texas.

‡Associate Chemist, Bureau of Mines, Petroleum and Natural-Gas Division, Amarillo, Texas.

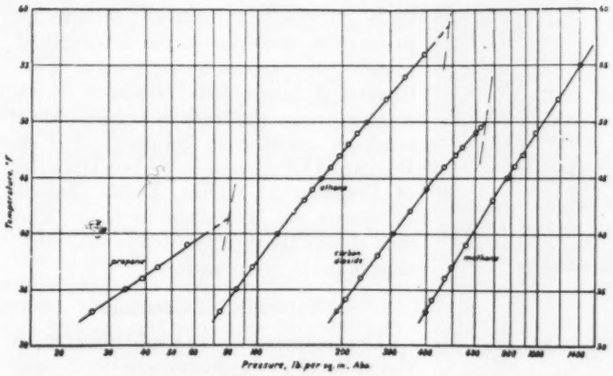

FIG. 2. Gas hydrate decomposition curves, pure gases. Analyses given in Table No. 1.

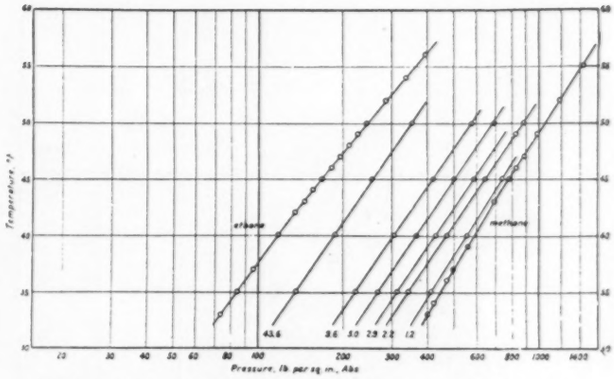

FIG. 3. Gas hydrate decomposition curves, mixtures of methane and ethane. Figures indicate percentage ethane.

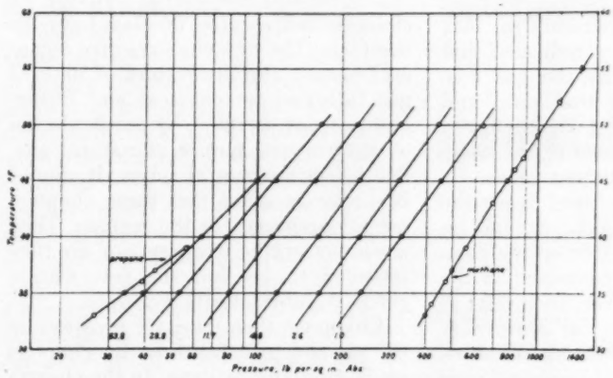

FIG. 4. Gas hydrate decomposition curves, mixtures of methane and propane. Figures indicate percentage propane.

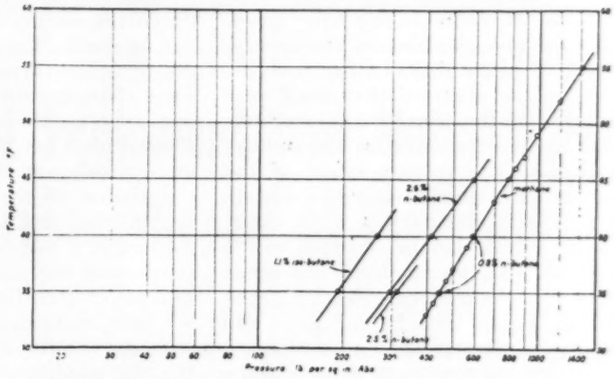

FIG. 5. Gas hydrate decomposition curves, mixtures of methane and isobutane and mixtures of methane and normal butane. Figures indicate percentage of butane.

TABLE NO. 1. ANALYSES OF GASES USED IN OBTAINING CURVES OF FIGURES 1 AND 2 IN PER CENT

NATURAL GASES

	A	B	C	D	E	F	G	H	I	J	K	L
Carbon dioxide	0.2	0.2	0.2	0.3	3.25	0.4	0.0	0.2	0.0	0.9	0.8	0.6
Hydrogen sulfide					0.25							
Nitrogen	7.7	1.1	9.4	9.5	1.1	0.3	1.0	14.3	3.4	1.2	25.0	0.2
Methane	65.4	87.9	78.4	79.4	87.8	91.0	90.8	75.2	88.5	90.6	67.4	96.5
Ethane	12.7	4.4	6.0	5.8	4.0	3.2	3.0	5.9	4.3	3.8	3.7	0.9
Propane	10.3	4.9	3.6	3.6	2.1	2.0	2.1	3.3	2.0	1.5	1.9	1.8
Butane and higher	3.7	1.5	2.4	1.4	1.5	3.1	3.2	1.1	1.7	2.0	1.2	
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
B.t.u., calculated	1,283	1,147	1,077	1,049	1,067	1,138	1,135	990	1,086	1,095	839	1,056

PURE GASES

	Carbon Dioxide	*Methane*	*Ethane*	*Propane*	*Iso-Butane*	*N-Butane*
Carbon dioxide	100	0.3	0.0			
Methane		99.7	0.8			
Ethane			97.1	0.2		
Propane			2.1	99.8	1.2	
Butane-iso					96.8	0.5
Butane-n					2.0	99.5
	100.0	100.0	100.0	100.0	100.0	100.0

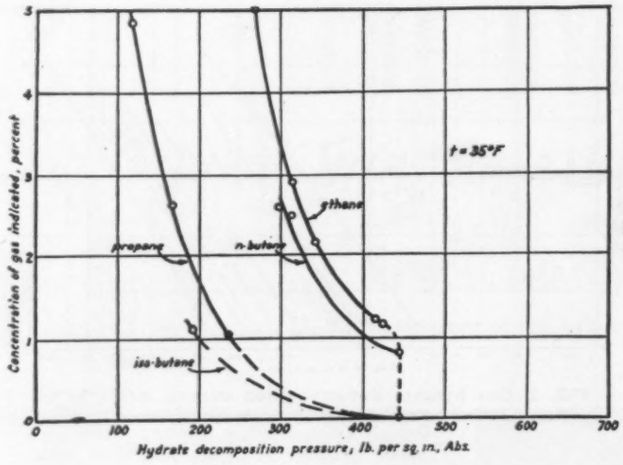

FIG. 6.

Effect of composition on hydrate characteristics of methane—gas mixtures, at 35° F.

portions of other high-purity gases. After the gases were mixed thoroughly, a sample was withdrawn for analysis.

It will be observed that small percentages of the heavier hydrocarbons shift the hydrate curve for the mixture markedly. The relative effect of the various gases used is shown by Fig. 6. It also is significant that when either iso- or normal butane is added to the methane gas, the hydrate characteristics are changed considerably, even though in our tests butane gases did not form hydrates when used alone.

Analysis of these data shows that the partial pressure of the gas added, calculated at the various decomposition temperatures and pressures, is always less than the decomposition pressure at the corresponding temperature for that gas by itself. This fact indicates that the hydrates formed by the gas mix were characteristic of that mix, and one may conclude that the hydrates formed were not hydrates of the heavier hydrocarbon constituent alone.

Isolation of the hydrates from the parent gases has been difficult, and information is not available on the composition of the gases contained in the hydrate crystal. However, such tests as we have made indicate, in conformity with the results of other investigators, that the hydrate crystal contains gases that, when in the pure state, do not form hydrates at the temperatures and pressures at which the complex hydrates are formed.

Some Training Courses Available To the Natural Gas Employe

• **JOHN A. RITTER, superintendent, Sun Oil Co., Dallas, Texas, in a paper, "Training Courses Available For Natural Gas Employes," presented before the Annual Convention of the American Gas Association's Natural Gas Section held at Houston, Texas, May 6-10, 1940.—(Abstract by G A S.)**

THE directors of industrial education for Oklahoma, Texas and Kansas realized the need for vocational training in both the natural gas and oil industry, and in 1932 enlisted the aid of the Production Division of the American Petroleum Institute for the purpose of developing courses of instruction applicable to field workers. It was essential that the text material adequately cover the various jobs and for this reason aid from the gas and oil industry was solicited.

A plan of cooperation was worked out whereby instructional material could be developed and validated by a committee of the Institute, but administered and taught by the individual states. This committee is composed of representatives of the various states and of the oil and natural gas industry. It assists the state representatives in outlining the scope of each course, as well as in procuring the necessary data and information for inclusion in the course, and finally, it reviews and validates the finished course.

Under this plan classes may be organized in any area where there is a sufficient number of interested workers, the only charge to the men being a small fee for each course, usually less than $2.50, and the cost of a text book for which he pays from 50 cents to $1.50, according to the course. If a worker successfully completes a course he is given a "Certificate"; then as he progresses and completes a specified number of courses, he receives a "Certificate of Attainment," both of which are signed by the state board of industrial or vocational training. A. P. I. Bulletin D-2-A, issued by the Division of Production, Dallas, Texas (copies of which are available to those who may desire them) completely describes this plan of cooperation.

Natural Gas Courses

The courses of special interest to the natural gas industry are the course "Natural Gas Production" and the course "Manufacture of Natural Gasoline."

The natural gas course contains 34 chapters and requires 96 class hours to complete. The first chapters give a general history and geography of natural gas followed by physical and historical geology, origin and accumulation of natural gas, nature of natural gas, and scientific laws of gases. It should be borne in mind that these chapters are all prepared for the layman. They are not scientific treatises, nor are they intended to be, but the information given is substantially accurate.

Chapter 6 then takes up prospecting for oil and gas, followed by chapters on leasing and drilling. In the chapter on leasing, for example, real and personal property are described; likewise the laws affecting ownership of oil and gas, including the law of capture, the general provisions of the lease forms in use, royalties, offset wells, unit operation, conservation, etc. Chapter 8 on "Drilling" describes briefly both standard and rotary systems and core drilling, as well as the function of the various tools. Then chapters follow covering casing and cementing, completing the well, gas well operations, capacity of wells, gas reserves, fuel measurements, the orifice meter, pressure regulation, transportation of gas, and the design, construction, operation and maintenance of pipe lines.

Gas distribution systems are studied in Chapter 21, likewise their construction and maintenance. There is a separate Chapter No. 23 on leakage and succeeding chapters on distribution regulation, measurement of gas consumption, utilization of gas, combustion of gas as fuel, gas burners, burner adjustment and control, domestic use of gas, industrial use of gas, reforming natural gas, liquefied gases, and finally Chapter 34 on miscellaneous uses of natural gas. This detail of the natural gas course is given to indicate its scope and application.

The subcommittee responsible for preparing this course is composed of A. W. Breeland, Lone Star Gas Co.;

C. L. Hightower, United Gas Pipe Line Co.; George Roth, The Cities Service Gas Co.

A course entitled "Natural Gas Engineering," Vol. III, has been developed by the Division of Mineral Industries Extension of the Pennsylvania State College, in cooperation with representatives of the gas industry and manufacturers of equipment in that state. This text is somewhat more advanced than the one just described, but covers very much the same ground. It has 553 printed pages, is profusely illustrated, and contains a large amount of data from publications of the American Gas Association and from its Gas Measurement Committee Report No. 2.

Another course of primary interest to the natural gas industry is the "Manufacture of Natural Gasoline," requiring 48 class hours to complete. It briefly describes the manufacture of natural gasoline, how discovered and developed, its current utilization, by-products and present-day size. This is followed by a detailed description of the nature and characteristics of natural gas and natural gasoline and its by-products. Then gasoline recovery and the Gas Cycle are discussed. Chapters are devoted to extraction by compression, charcoal absorption and oil absorption. The first division of the course ends showing natural gasoline's place in the petroleum industry.

The second division describes processes and equipment as follows:

Mechanics of gases,
Gathering system,
Automatic plant control devices,
Distillation,
Boiler and steam supply,
Water supply,
Fractionation or stabilization,
Treating,
Storage,
Loading and product disposal,
Plant laboratory,
Orifice meters,
The test car, and
Plant records and reports.

To give an idea how these subjects are again sub-divided, Unit III on "Automatic Plant Control Devices" deals with five subjects:

Pressure control,
Back pressure regulation,
Reducing pressure regulation,
Flow control, and
Temperature control.

The course was prepared by Paul J. Phillips of the Oklahoma A. & M. College and validated by the A.P.I. Topical Committee after being reviewed by the following subcommittee from the natural gasoline industry: Rex Morgan, manufacturing engineer, Gasoline Division, Phillips Petroleum Co.; E. K. Anderson, general superintendent, Gasoline Division, Skelly Oil Co.; H. W. Harts, general superintendent, Warren Petroleum Co.

FIG. 1. Tractor with rolling scraper being used in uncovering pipe.

Maintaining Equipment and Material for The Emergency Repair of Pipe Lines

THE Natural Gas Pipeline Co. of America and its affiliated Texas company, the Texoma Natural Gas Co., operate a high pressure gas pipe line system from Fritch, Texas, in the Amarillo field to Joliet, Ill. The natural gas requirements of the city of Chicago and vicinity, and other important communities along the route, are served through a single 24-in. line operating under a high annual average load factor.

A continuous supply of gas is extremely important and necessary for the domestic and high class industrial load served. The time required to restore service following a forced interruption must therefore be held to a minimum.

With this in mind the Company has expanded its stock of emergency repair equipment and materials to considerable detail and completeness.

The operating pipe line organization consists of three divisions and seven districts, with maintenance crews located at 13 points. These crews, with three exceptions which operate with pickup trucks, have 3-ton trucks equipped with winches, booms, pole trailers, and engine beds for heavy hauling and pickup trucks for light work and gang transportation. An adequate stock of small tools and material is maintained at each locatiotn. Each district has a 100-cu.-ft. per minute portable air compressor with demolition, grinding and chipping tools, and sand blast equipment.

• **UNEXPECTED DAMAGES to or ruptures of a gas transmission line usually occur at times when the weather conditions are unfavorable, making rapid repairs most necessary but more than ordinarily difficult. It therefore appears highly desirable to have a well organized plan of procedure together with stocks of materials at frequent points along the line, so that no delay will be occasioned by having to obtain material or transport it from distant points. The organization of the Natural Gas Pipeline Company of America, as described by Division Superintendent H. E. SMITH in a paper, "Emergency Repair Equipment and Material," presented before the Annual Convention of the American Gas Association's Natural Gas Section held at Houston, Texas, May 6-10, 1940, should be of considerable interest to all pipe line maintenance engineers. — (Abstract by G A S.)**

Each crew is provided with electric and acetylene welding equipment, lowering-in horses with hand winches, a No. 22 Caterpillar tractor with tail winch, rolling scraper (see Fig. 1), slip scraper, Mormon boards, paint heating kettle, a 3-in. hand diaphram pump, a 3-in. light engine driven centrifugal pump, a 4-in. 40,000-gal. engine driven centrifugal pump (shown in action in Fig. 2), one or two 6-in. engine driven 90,000-gal. centrifugal pumps (all crews except three have two 6-in.), a stone boat for hauling material behind the tractor, loading skids for easy loading and unloading of the tractor on the truck bed, a portable electric lighting system including an engine driven generator, four standard lights, two

FIG. 2. A 4-in. pump and well points used in maintenance work are shown in operation during changing of joint of pipe in river bottom.

flood lights, a trouble light and 1200 ft. of cable, a 14 x 21 ft. wall tent for use as an emergency office and warehouse, a wood stove for heating the tent, folding demountable benches and table, tool boxes containing emergency wrenches and hand tools, tool boxes containing maintenance tools, oils, grease and grease guns for the power equipment, and a box of office supplies for use in emergency work, including all payroll and employment stationery and employe identification badges. A steel row boat is included at a few locations where it might prove of use on flooded streams.

Separate Warehouses

This emergency equipment is stored in a separate warehouse, a 24 x 48 ft. corrugated iron steel-frame building constructed with one driveway bay and three platform bays. Fig. 3 is a view of this warehouse. A supply of burlap bags to be used as sand bags, is kept in a loft over one bay of the building. Closed shelving contains a stock of gaskets, paint brushes, cleaning brushes, paint canvas, gate flange bolts, welding flanges, weld reinforcing saddles, small gates, and fittings. Also maintained in this warehouse is a stock of spare gates, gate blowoff extension nipples and flanges, extension wrenches for opening blowoff gates, split welding sleeves for welds; split welding sleeves for couplings, emergency bypass connections for connecting blowoff valves around a main line gate, and discharge piping for the power driven pumps. The suction hose for the pumps is stored under the platform of the warehouse. This material is so arranged so as to be readily accessible for loading, and a sufficient stock of material and spare parts is maintained to meet probable requirements. The boxes of tools, lighting equipment and emergency office supplies are painted distinctively and labelled, and their contents are not used in ordinary activities.

Emergency racks for spare pipe and sleeve houses, containing complete split coupling emergency sleeves, blowoff gates, and blind flanges, are maintained at approximately 20-mile intervals along the main line and at each river crossing. Supplies of spare pipe, split coupling emergency sleeves, and Vanstone nipples with flanges, are kept at each point where maintenance crews are located. Wrinkle type expansion joints for emergency bends, spare drips and headers, main line gate valves and river header gate valves are stored at district headquarters.

Special equipment, available for use as needed on the system includes a well point system for dewatering quicksand areas. This consists of 110 well points and 500 ft. of 6-in. header with the necessary fittings for connecting the points to the header and header connections to the pumps. The regular 4- and 6-in. pumps are used for jetting and pumping. Two three-eighths yard truck-mounted power shovels equipped with pull shovel and drag line attachments have been recently purchased and are available for deep bell hole and regular excavation work. These shovels have a highway road speed of 22 miles per hour.

Short Wave Radio

A short wave radio communication system for emergency use has been installed on the northern end of the system. This includes six portable transmitting and receiving stations and receiving sets on all pipe line trucks, pickups and cars. The radio communication system is strictly for emergency use, supplementing the regular telephone communication, and is not used for regular operating or business communications.

Two high pressure engine driven alcohol injection pumps are available in the field gathering system or where needed to spray alcohol into the line to combat hydrate freezing. This year snow plows are to be purchased for opening blocked highways in case of emergencies. All this equipment has been accumulated gradually, until the Company now feels that it is adequately prepared to meet emergencies whenever they may occur.

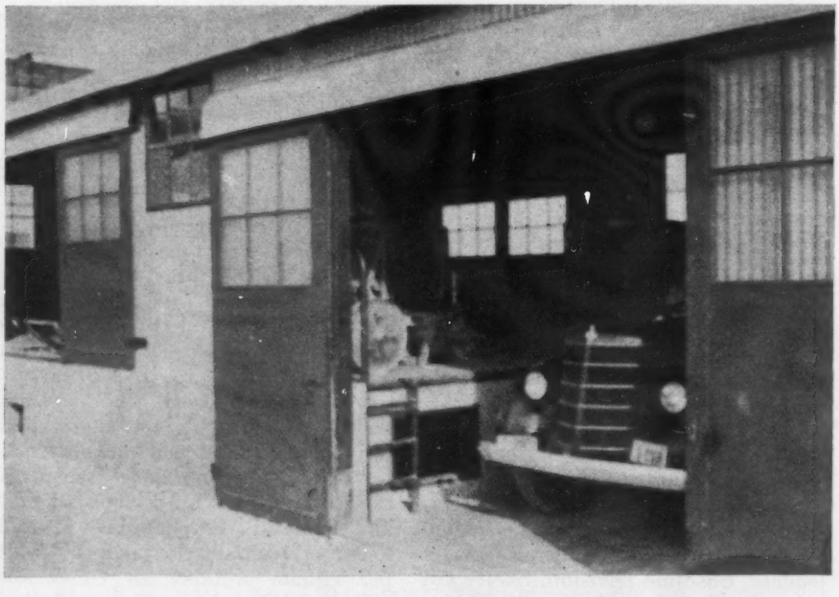

FIG. 3. Loading door and driveway at one of Natural Gas Pipeline Company's emergency equipment warehouses.

An Improved Holiday Detector for Testing Pipe Coatings

FIG. 1.

Testing stacked pipe in the yard with the holiday detector. This picture shows the use of the wire reel, where no ground connection to earth is used. The brush angle is adjusted for use in testing pipe higher than the operator's waist.

IT has been common practice for several years to test the protective coating on underground pipe lines by means of a high tension coil and metallic brush. This equipment, usually called a "holiday detector," locates holes or weak spots in the coating by means of the spark which passes from the brush through the hole to the metallic pipe.

Early in 1939, the Southern Counties Gas Co. adopted the practice of testing all coated pipe in place in the ditch, just before backfilling. Prior to this, it was customary to use the holiday detector only in testing new types of coating or special installations in very corrosive soils. Under the new practice, all field crews repairing or installing coated lines were required to use a coating tester as part of their regular equipment. Since there were no suitable holiday detectors on the market at that time, Southern Counties Gas Co. decided to develop its own equipment. After considerable experimental work, a satisfactory model was completed.

After contacting several companies, arrangements were finally made with one manufacturer to supply brushes comprising tufts of steel bristles mounted in a cast aluminum frame. Since the tufts are about 3/16 in. in diameter, and fan out slightly, a strip of pipe about 5/16 to 3/8 in. square is contacted by each tuft. By trimming the bristles to different lengths, the same sized casting is used for several brush sizes. The holes are drilled in the casting and the bristles inserted and wired in place in exactly the same manner as used in fabricating ordinary wire brushes. A leather cover is used to protect the lacing wires which retain the bristles in the aluminum frame.

Three ribbed lugs are provided so that the brush may be mounted in different positions depending on whether the pipe is tested in place in the ditch or whether it is tested aboveground. The lugs at the ends of the brush frame enable the operator to walk along the top of the ditch and test the coating on the under side of the pipe. The frame extends over an arc of 225 degrees, so that the bristles extend slightly more than halfway around the circumference of the pipe. The bristles are flexible enough to adapt themselves to ½ in. variations in pipe diameter. Fig. 1 shows the brush in use, together with other positions of the apparatus.

▼

When testing pipe coating in noisy locations, it is impossible to locate the holidays by means of the sound produced by the spark jumping from the brush to the pipe. In some cases, it is possible to use the visible spark for this purpose; however, this is not practical when testing the under side of the pipe in the ditch. The holiday indicator lamp developed by Southern Counties Gas Co. shows that the brush has passed over a hole in the coating by giving a brilliant red flash of light. A special neon lamp was developed, constructed from heavy wall small diameter tubing so that it will glow brilliantly on a comparatively low voltage. The small diameter hole optically intensifies the brilliancy of the red glow produced by the neon when current flows. The heavy wall tubing also makes the lamp rugged enough to withstand rough handling. The tube is coiled in a zigzag shape with the coils overlapping slightly so that when illuminated it produces a 2¾ x 1½ in. rectangle of light. As shown in the wiring diagram, Fig. 2, the lamp is connected in series with the high potential wire connected to the brush. A 10,000 ohm, 10 watt wire-wound resistor is connected in parallel with the tube to by-pass the small leakage current which continually passes to the brush where it is dissipated as corona loss. The combination of the above resistor with the lamp produces a brilliant red spark with the slightest direct spark at the brush, and at the same time prevents the tube from giving a visible glow under normal conditions.

The neon lamp, mounted in rubber rings to protect it from shock, is attached to a ¼ x 2¼ x 3¼ in. bakelite block which also supports the resistor and high tension wire jacks. A rectangular fibre shield about 6 in. deep protects the lamp and excludes extraneous light so that even in brilliant sunlight, the tube appears black when not illuminated. The lamp assembly is mounted as close to the brush as possible so that the operator can easily see the light without taking his eyes off the brush (see Fig. 1).

For portable operation, using dry cells, a number GH-188, type K ignition coil gives by far the most satisfactory performance. This coil is ordinarily used in gasoline jack hammers. The vibrator operates at a much higher frequency and retains its adjustment for longer periods than the conven-

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H. J. KEELING

HOLIDAY DETECTORS for the testing of pipe coatings have been used in the past with varying degrees of success. Some of these have been gadgets rather than practical or useful instruments, the operators being largely devoted to adjusting, moving from place to place, untangling wire, and avoiding shocks, rather than searching for and disclosing holidays. Also, as the means of disclosure has usually consisted of observing or hearing a spark, holidays have, no doubt, often escaped detection. This apparatus has been developed to eliminate such drawbacks and difficulties, and would appear to be a real contribution and of great assistance to the effective application of pipe coatings. The paper which describes this apparatus was presented by HARRY J. KEELING, Southern Counties Gas Co., Los Angeles, before the Spring Technical Conference of the Pacific Coast Gas Association, held in Los Angeles, Calif., April 11-12, 1940. (Abstract by GAS.)

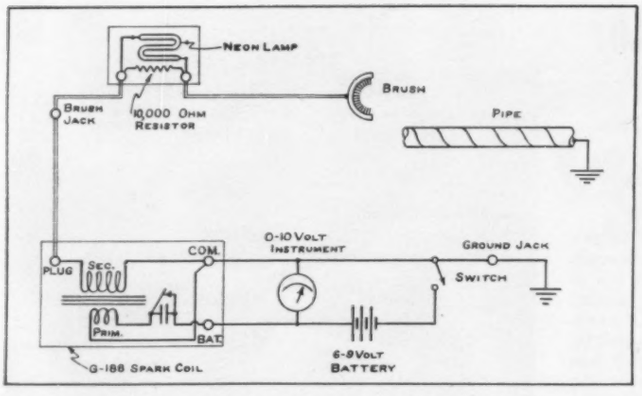


FIG. 2.
Schematic wiring diagram of complete holiday detector equipment.

tional Model T Ford coil, at the same time drawing only a reasonable current from the battery. At 9 volts, the GH-188 coil draws 2.3 amperes and produces a spark length of 0.75 in. between points. At 6 volts, it draws 2.1 amperes and produces a 0.55-in. spark.

The dry cell battery and spark coil are housed in a fibre case carried at the operator's waist. By carrying the coil and batteries, the operator may test 500 ft. or more of pipe line without having to stop to make adjustments in the equipment. To do this, it is only necessary to ground the pipe at one point, and no direct ground is required if the pipe consists of one long welded length close to the ground. If the operator uses a portable ground wire trailing behind him, an unlimited length of pipe may be tested without stopping to change connections. It is not necessary that the trailing ground wire make good contact with the earth; if it is 20 or 30 ft. long, the high tension current will be grounded sufficiently through the capacity between the wire and earth.

The case is designed to hold three type 4F2H 3-volt batteries connected in series to give 9 volts. In certain cases, the spark length produced by the 9-volt battery breaks down the pipe coating. Under these conditions, one 3-volt battery is removed leaving only 6 volts impressed across the coil.

Lacquered neon sign cable with 10,000 volt insulation is the most suitable material for the high tension wiring. This wire is superior to the best auto ignition cable. An 18-ft. length equipped with jacks on each end is used with the holiday detector. The excess wire is coiled around two cast bronze lugs attached to the wood handle. Rubber covered stranded No. 18 wire is used for the ground connection. Ordinarily, the 20-ft. length carried on the inside of the battery box cover is sufficient; however, in some cases, it is desirable to have additional wire available. The reel provided with this equipment is a standard item built for use in electrolysis surveys or for pipe locating work; it holds 500 ft. of ground wire.

The total cost of one holiday detector, complete with carrying box, is $117.52, as constructed in the company shop.

Petroleum Reserves Discovered in 1939 Total Over Two Billion Barrels

NEW, proved petroleum reserves totalling 2,399,122,000 bbls., nearly double the amount of oil produced in 1939, were discovered or developed in new and old oil fields of the United States during last year, according to a recent report of the American Petroleum Institute's Committee on Petroleum Reserves.

The net increase of 1,134,866,000 bbls. in known underground stocks of petroleum, after deduction of the 1,264,256,000 bbls. of oil produced in 1939, raised the January 1, 1940, proved-reserve inventory to a new record total, 18,483,012,000 bbls. This total, the committee emphasized, represents only a conservative estimate made by the many geologists and petroleum engineers who participated of the reserves already proved by drilling and recoverable by present production methods. No estimates are included for oil which still is to be found in areas known to be favorable to the accumulation of oil, but as yet untested.

New pools and new producing horizons discovered in 14 states last year gave the nation a minimum of 340,667,000 bbls. of new reserves, the committee stated, adding that "pools tested by only one or two wells have been assigned relatively low reserves which may be considerably augmented by later development."

The greatest increase in reserves, according to the report, was in Texas, which added 805,134,000 bbls. of new underground oil inventory. Texas also leads all other states in total reserves, its already proved petroleum resources amounting to more than one-half of the U. S. total. California, with 567,933,000 bbls. of new reserves discovered or developed in 1939, was second.

Third largest gain was recorded in Illinois, where developments in 1939 added 233,091,000 bbls. to the previous total. Proved reserves for the state on January 1, 1940, were estimated by the committee at 381,636,000 bbls. Two years ago, on January 1, 1938, total reserves then known amounted only to 40,884,000 bbls. New reserves of more than 100,000,000 bbls. also were developed in each of three other states last year: Arkansas, Kansas, and Louisiana.

Two states, Mississippi and Nebraska, in which commercial quantities of oil were discovered late in 1939, entered the reserve estimate for the first time. Proved reserves in the new pools in these states, still incompletely developed, conservatively were estimated by the committee at 6,800,000 barrels.

■ ■

Pittsburgh Group Plans to Build 117-Mile Line

Construction of approximately 117 miles of pipe line, two compressor stations, a dehydration plant and three measuring stations is being planned by the Pittsburgh Group of Columbia System utilities, it was announced recently by Charles E. Bennett, president. The cost of the contemplated project is estimated to be $1,700,000.

The major portion of the new line will parallel the existing line between Rimersburg and Bradford, Pa., and will consist of 12 miles of 16-in., 6 miles of 12-in., 28 miles of 10-in., and 71 miles of 8-in. pipe. Actual construction of the line will not begin until the financing plan has been approved by the Pennsylvania Public Utility Commission and the Securities and Exchange Commission.

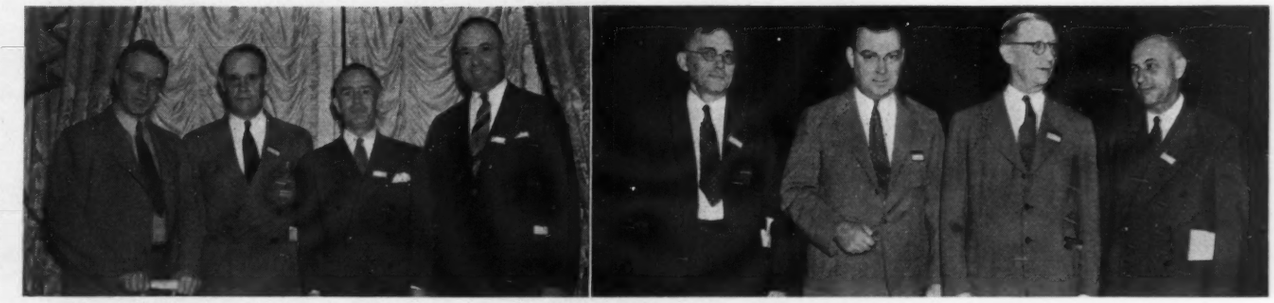
Natural gas will be transported through the line to the Pennsylvania-New York state line for service to customers of the Home Gas Co., an affiliate of the Pittsburgh Group. The gas will be purchased from the United Fuel Gas Co.

■ ■

Chattanooga Gas Sup't Dies

Alford N. Smith, 64, superintendent of the Chattanooga (Tenn.) Gas Co., died at his home May 11.

Mr. Smith had been employed by the local gas company for the past 38 years.



AT LEFT: Floyd C. Brown, Natural Gas Pipeline Co. of America, Chicago; L. D. Williams, Texoma Natural Gas Co., Fritch; Julian L. Foster, Lone Star Gas Co., Dallas; J. French Robinson, Peoples Natural Gas Co., Pittsburgh. RIGHT: Harry D. Hancock, Gas Advisers, Inc., New York; E. Holley Poe, A. G. A., New York; A. B. Groesbeck, United Gas Corp., Houston; E. F. Schmidt, Lone Star Gas Co., Dallas.

Houstonian Highlights

By CRAIG ESPY

ATTENDANCE records toppled, conviviality reigned, and the horizons of natural gas were broadened when 1337 men of the industry registered (over 2500 attended) at the Rice Hotel in Houston, Texas, on May 6 for the four-day session which was to be the combined meeting of the American Gas Association's 35th Annual Natural Gas Section Convention and 17th Distribution Conference. Chairman Elmer F. Schmidt, who presided so ably over the Natural Gas Section, may well feel proud of the records broken by the 1940 convention.

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A. B. Groesbeck, general chairman, and Frank C. Smith, co-chairman of the General Arrangements Committee, were accorded many tributes of praise and of congratulation for the splendid success of the meeting. Complete in every way, there was nothing lacking. Holley Poe, Natural Gas Section secretary, said the Houston companies to a man did their jobs well.

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ELMER F. SCHMIDT, chairman of the Natural Gas Section: *"There is no question but that recent extensions of natural gas service and the growing industrial appreciation of natural gas 'as the ideal industrial fuel' have both had a great influence in the last five years, not only upon the nature of, but upon the geographical distribution of American industry. . . . The Natural Gas Section of the A.G.A. wrote to all natural gas company members, asking for information regarding the number of new industrial plants that had moved into their territory.*

"The territories served by the 32 replying companies embrace 18,000,000 population and include over 4,000,000 gas meters — or roughly 55% of all U. S. natural gas meters.

"It was reported that roughly 2000 new plants had been installed in this one-half of our natural gas territory in the last five years — that roughly 2400 existing plants had made significant additions to their facilities — and that over three hundred million dollars had been spent by American industry in thus moving into or expanding within the reporting natural gas territories on a broader scale. Further, these new or expanded natural gas-using industries have put to work 85,000 more employes — employes not on their payrolls in 1934.

"Nor is the effect upon our own sendout any the less desirable. The 32 companies reported that these new and expanding industries have added to the annual gas load fifty-seven billion cu. ft."

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The Postal Telegraph, American Gas Association service, helped wandering delegates to keep tabs on one another — as did also the published list of registrants.

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H. C. COOPER, Hope Natural Gas Co., Pittsburgh (speaking on the Technical and Research Committee): *"As a first step, the work was divided into several departments. . . . Then we began forming the special committees for the particular items to be studied. . . . Several of these early committees were expected to complete their particular projects and then disband, but instead they have gradually transformed themselves into permanent institutions in our Association. . . . The personnel of these departmental committees has changed but little during the years. . . . This plan of retaining men on committees on a permanent basis results in efficiency and helps in keeping us up to date on any subject. . . ."*

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Harry D. Hancock (of Gas Advisers, Inc., New York City), vice chairman of the Natural Gas Section, presided over the second General Sessions Program.

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WALTER C. BECKJORD, president, American Gas Association: *"The larger developments which have taken place within recent times in natural gas industry are forerunners of what is coming in the future. Products ranging from dynamite, rubber tires and silk stockings are now made from natural gas. I am satisfied that we have only scratched the surface in the development of natural gas, and more is coming."*

• • •

C. H. Waring, Kansas City Gas Co., presided as chairman over the Distribution Conference program. This is the first time the Conference has been brought to the West. There was no separate count of Distribution Conference men but a total of 426 attended the Distribution Conference Committee Round Table Luncheons held Tuesday of the convention. Construction and maintenance problems were discussed before two of the groups, appliances and appliance servicing before two other groups, and meters and regulators before another. The chairmen of the luncheons were E. G. Campbell, A. C. Cherry, W. M. Little, J. M. Pickford and A. W. Fuller.

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Members of the Oklahoma Natural Gas Co. seemed to be particularly favored in the drawing of attendance prizes at the Domestic Gas Sales Conference. R. S. Agee presided over one of the drawings and H. Vinton Potter over the other.

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Just about everything pertaining to gas transmission was discussed at the Transmission Conference. Subjects ranged through pipe protection, natural gas flow, odorization, dispatching, emergency repair, hydrates, control, analysis of costs, and operation and maintenance. F. A. Hough, W. W. Colley, Raymond Ransom, Thomas S.

F. T. PARKS
Public Service Co. of Colorado
JESSIE McQUEEN
A. G. A., New York City
F. A. HOUGH
Southern Counties Gas Co.
E. M. CONVERSE
Dearborn Chemical Co.
FLOYD GAUNT
Reynolds Gas Regulator Co.
M. W. WALSH
Louisville Gas & Electric Co.
HARRY E. SOUTHARD
M. B. Skinner Co.
H. A. KAHLER
Sprague Meter Co.
M. PICKFORD
Indiana Public Service Co.
VINCENT C. HADDICK
Rochester Gas & Electric Corp.
J. M. FISHER
Bryant Heater Co.
R. G. SOPER
Dallas Gas Co.
B. SONNTAG
Vent-A-Hood Co.
MAURICE WHITE
Mobile Gas Service Corp.
A. S. KINCAID
Ward Heater Co.
JAMES J. MERIG
Mobile Gas Service Corp.
E. L. PAYNE
Payne Furnace & Supply Co., Inc.
L. FORBES, JR.
Natural Gas Co.
R. S. AGEE
A. G. A. E. M., New York City
C. B. WILSON
Arkansas-Louisiana Gas Co.
ARTHUR KERR
Pittsburgh Equitable Meter Co.
HAROLD MUELLER
L. J. Mueller Furnace Co.
HOMER MEAD
Southern Counties Gas Co.
WALTER G. GROTH
Burkay Co.
G. A. BOWMAN
Robertshaw-Thermostat Co.
GEORGE S. JONES, JR.
Servel, Inc.
W. H. SPEARS
Gas Pipe Line Co.
F. C. ARMBRUSTER
Middle West Service Co.
R. W. STAFFORD
Connelly Iron Sponge & Governor Co.
R. M. REDDING
Dallas Gas Co.
F. L. CARMICHALL
Lone Star Gas Co.
E. J. STERN
Atlanta Gas Light Co.
ALBERT S. JOHNSON
Southern Union Gas Co.
NORRIS BLANCHARD
L. J. Mueller Furnace Co.
L. D. WITTKOWER
George D. Roper Corp.
B. M. LAULHERE
Southern California Gas Co.
CHESTER L. MAY
Community Natural Gas Co.
T. J. STRICKLER
Kansas City Gas Co.
E. G. MATTHEWS
Pacific Gas Radiator Co.
BOB CANNIFF
Servel, Inc.
A. C. GRANT
Minneapolis Honeywell Regulator Co.
S. P. COBB
Ebasco Services, Inc.

F. L. FAIRCHILD
Sprague Meter Co.
H. N. MALLON
Dresser Mfg. Co.
MARGARET MARABLE
Servel, Inc.
WALTER C. BECKJORD
Columbia Natural Gas Co.
E. B. COPHER
U. S. Heater Co.
ROBERT J. KUHN
Consulting Engineer,
New Orleans
FRANK J. NUGENT
Rheem Mfg. Co.
C. I. WALL
West Texas Gas Co.
BERT P. FISHER
Payne Furnace & Supply
Co., Inc.
T. F. MERRIAM
Northern Natural Gas Co.
J. G. TOOKER
Gas Service Co.
W. T. RASCH
Security Mfg. Co.
MIKE MEUFFELS
Reynolds Gas Regulator Co
FRANKLIN T. RAINEY
Ohio Fuel Gas Co.
C. W. BERGHORN
A. G. A. E. M., New York City
R. M. CONNER
American Gas Association
GEORGE M. PARKER
Mississippi River Fuel Corp.
H. VINTON POTTER
Oklahoma Natural Gas Co.
A. E. HIGGINS
Pittsburgh Equitable Meter Co.
L. B. DENNING, JR.
Community Natural Gas Co.
H. CARL WOLF
Atlanta Gas Light Co.
J. E. DALLOW
National Supply Co.
DEAN A. STRICKLAND
United Gas Corp.
L. A. BICKEL
Dallas Gas Co.
S. D. DAY
The Barrett Co.
R. D. SMITH
Montana Power Co.
GEORGE McCOMB
The Barrett Co.
R. G. ROBERTS
The Barrett Co.
E. R. MYHRE
General Gas Light Co.
D. W. REEVES
Oklahoma Natural Gas Co.
JAMES C. REID
Southern Union Gas Co.
C. H. ZACHRY
Southern Union Gas Co.
R. M. SCOGGINS
Arkansas-Louisiana Gas Co.
H. C. COOPER
Hope Natural Gas Co.
H. P. PRICE
H. C. Price, Inc.
T. R. JONES
T. R. Jones Co.
P. M. BIDDISON
Consulting Engineer, Dallas
JOHN E. DIEHL
American Meter Co.
C. N. PAYNE
American Meter Co.
J. J. DELANEY
Reliance Regulator Corp.
E. J. HATZENBUEHLER
Lone Star Gas Co.
LEE HOLTZ
Southern California Gas Co.

AT LEFT: Robert W. Hendee, Colorado Interstate Gas Co., Colorado Springs; D. A. Sillers, Lone Star Gas Co., Dallas; A. C. Cherry, Cincinnati Gas & Electric Co., Cincinnati; L. W. Tuttle, Public Service Co. of Northern Illinois, Oak Park. RIGHT: Walter C. Beckjord, Columbia Gas & Electric Co., New York; D. A. Hulcy, Lone Star Gas Co., Dallas; Davis M. Debard, Stone & Webster Service Corp., New York; Major Alexander Forward, American Gas Association, New York.

Bacon, W. T. Bulla, C. H. M. Burnham, H. E. Smith, W. M. Deaton, E. M. Frost, B. L. Rogers, O. H. Moore, H. J. Carson, J. H. Lang, C. B. Abbot and W. R. Beardsley presented papers. George S. Young, scheduled to preside, couldn't attend the meeting due to sickness in his family. Ben Laulhere, G. J. Neuner and C. H. M. Burnham presided over the three sessions in his absence. One man said the program was equal to a study course in Gas Transmission.

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Henry O. Loebell detailed what improvements have been made in industrial processes as a result of better heat application and what differences the improvements make to us as individuals or as members of the gas industry.

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D. W. HARRIS, vice president and general manager, Arkansas-Louisiana Gas Co., Shreveport: *"In emphasizing the value of industrial revenues in relation to a total operating income, we have obtained sales and revenue information from six of the major integrated natural gas companies in the South and Southwest. . . . The 1939 total sales of these companies, exclusive of certain field sales, amounted to 419,000,000 cu. ft. of gas, with gross revenue of $87,000,000. The industrial sales accounted for 65.1% of the volume and 37.4% of the gross revenue. The total volume of sales of these companies was 32% of the total natural gas sales in the United States for the year 1939 and was 19.4% of the gross revenue received by all natural gas companies in the United States during that year."*

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Atlanta, Ga., hopes to entertain the next annual natural gas conclave. Carl Wolf, Atlanta Gas Light Co., and his cohorts made good use of "Georgia Peach" slogan buttons in advertising Atlanta as the prospective meeting place.

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H. W. GRAHAM, director of Metallurgy and Research, Jones & Laughlin Steel Corp.: *"Research in the steel industry will not only directly and indirectly help in extending the use of gas or gas products, but it will also make better tools available to the gas industry with which to work, and it will very definitely extend the use of gas and gas products through the application of versatile steels to appliances which are involved in the use of those products."*

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The boys who had never seen negroes shooting craps got a view of this national pastime in the crap-shooting prelim to the domestic sales conference.

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Robert E. Hull chairmaned the first Accounting Conference. On the program were C. E. Packman, Francis B. Flahive, H. W. Goodson and E. N. Keller. Francis B. Flahive presided over the second conference, which presented L. L. Dyer and an open forum discussion.

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E. L. WILLIAMS, head of Department of Industrial Education, School of Engineering, A. & M. College of Texas, College Station (on the Conference Method in Employe Training): *"The conference is an effective training tool with any group, providing the group is composed of all the same level of employes, in the same type of work, and the discussion directed to topics within their experiences and of interest to them. The chief purposes of a conference are: (1) to develop constructive group thinking, (2) to assist men in identifying their responsibilities, (3) to develop or encourage cooperation, (4) to capitalize on the valuable experiences of men who have been doing the job, (5) to develop a better coordination of efforts of individuals and departments."*

Wesley F. Wright of Dallas Gas Co. and Herbert Turner of Houston Gas and Fuel Division, Houston.

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Holley Poe introduced an innovation at Tulsa last year when he launched a breakfast party for the press, both visiting members and local. The affair took on even more important proportions at the Houston meeting. The large table was well surrounded by hungry pencil shovers.

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The Domestic Gas Sales Conference, presided over by Davis M. Debard as chairman, placed special emphasis upon entertainment features and showmanship (1) to attract interest, (2) to get over essential sales facts in a delightful way.

Information Please was such a feature. R. C. Anderson, J. H. Warden, J. G. Tooker, B. T. Franck, Jessie McQueen and T. J. Strickler answered questions put to them by Master of Ceremonies W. C. Beckjord. The questions originated with gas companies. Not a single question went unanswered due to the expertness of the experts.

Other such features were the talks by H. Carl Wolf and R. S. Agee and the Appliance Promotion skit featuring H. Vinton Potter, Albertine Berry, Alice Livermore, Mary Frances Reece, Margaret Marable, Gertrude Payne, and Jane Tiffany Wagner.

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L. O. Vogelsang, San Antonio Public Service Co., liked the "Sell the Gas Company to the Community" theme which was forcefully presented to the convention.

• • •

C. L. Hightower, United Gas Pipe Line Co., presided over the Accident Prevention Conference. Speakers presented on the program were W. D. Morris, United Gas Pipe Line Co.; K. L. Simons, United Gas Corp.; R. B. Roaper, Humble Oil & Refining Co.; Tod Pazdral, Lone Star Gas Co., and J. A. Bates, Lone Star Gasoline Co. Mr. Hightower also presided over the Employe Education Conference. E. L.

Williams, A. & M. College of Texas, O. L. Jones, Oklahoma Natural Gas Co., and John A. Ritter, Sun Oil Co., appeared on the program. D. H. Tucker, El Paso Natural Gas Co., presented a movie on "Getting Gas to the Customer."

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Luncheon Speaker H. C. THUERK, Utility Management Corp., said: *"Probably no local industry is more dependent for its livelihood on the general welfare of a community than is a utility company. . . . There is therefore full justification for the gas company to work hand in hand with civic groups and agencies in developing its service areas, realizing that as these areas grow and develop, additional business accrues to the company."*

• • •

A luncheon feature was the Variety Show staged by Home Service. Albertine Berry, Mary Alice Crosson, Nell Read, Evelyn Barton and Emma Wood participated. On the same program F. M. Rosenkrans read a paper prepared by B. C. Adams, who could not attend the meeting.

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"You may think it funny for a sales-minded person to say," said B. H. Gardner, Columbia Engineering Corp., "but I found the symposium on Underground Storage of Gas to be the most interesting.

"Underground storage supply affects our ability to carry house heating load economically and efficiently," he pointed out.

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WARREN T. BULLA, Natural Gas Pipeline Company of America, Chicago: *"The use of radio has long been recognized as a means of augmenting the usual telephone and telegraph land lines. Due to a lack of knowledge, that permission to operate emergency radio equipment can be obtained, or a lack of appreciation on the merits of such equipment for emergency use, or possibly a reluctance to obtain such equipment because of costs, supervising and personnel problems, the adoption of radio by gas pipe line companies has been very limited.*

"Briefly, radio communication is necessary to provide communication during emergencies due to pipe line failures in order that the disruption of gas service to a community may be confined to a minimum period. Aside from this, radio will be of benefit in time of flood or local disasters such as the Ohio River flood when normal means of communication are rendered inoperative."

C. J. Neuner of Panhandle Eastern Pipe Line Co., Kansas City, converses with Howard Pape, Crane Co., Chicago.

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"It was the finest convention I ever attended," said Jules D. Roberts, Mountain Fuel Supply Co., Salt Lake City. We have reason to think that Jules was not alone in this conviction.

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Carl U. Daniels, Fenton Finn, J. H. Isherwood, Porter D. Mellon, D. P. Hartson, L. T. Potter, E. O. Schillhahn and T. J. Tonkin, Jr. took part in the Production Conference Symposium entitled "Our Experiences With the Underground Storage of Gas." Another symposium on drilling presented C. E. Reistle, H. P. George, H. A. Wallace, Jr., and E. H. Tollefson. S. A. Chadwell spoke on "Natural Gas Storage and Its Effect on Transmission Operations," with C. K. Eilerts and R. Vincent Smith speaking on "A Study of Mixtures of Separator Gas and Liquid from a Combination Well at Cayuga, Texas." Dr. R. L. Huntington and Charles D. Schmidt discussed "Distillate Fields on the Gulf Coast." J. French Robinson, chairman, presided over the Production Conferences.

• • •

"The thing I got the most from at the convention," said R. A. Cattell, Bureau of Mines, Washington, D. C., "was the research portion of the program. Research, both fundamental and applied, was the big central theme of this convention. This subject has been stressed more at this convention than at any other natural gas conference I have attended."

• • •

G. H. BOYD and E. G. WATKINS, Consolidated Edison Company of New York, Inc. (on Low Cost Housing): *"A typical New York City Low Cost Housing Project will consist of a group of six-story elevator apartment buildings housing from 450 to 5,000 families. . . . Generally the plan provides for cooking with gas, lighting and refrigeration with electricity. Heating and hot water are provided from central oil- or coal-fired heating plants which supply several buildings. . . . Gas and electricity are included with the tenants' rent, so that only one metering installation per service is required. In the case of gas, each metering installation consists of two meters, each meter rated for 60 per cent of the maximum demand on the service. . . . The billing and collection problem is reduced to handling one customer instead of thousands. On the opposite side is the money spent to retire existing facilities and install new ones; probably reduced revenue per family. If the metering and billing savings compensate for any reduced revenue, our position will be at least as satisfactory as it is now. . . ."*

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In one of the Distribution Conference sessions presided over by C. H. Waring as chairman, three papers on distribution design were brought by G. J. Heckendorn, Lee Holtz and H. E. Bates. At another session there were three papers on corrosion which were presented by Dr. Scott Ewing, Raymond F. Hadley and R. J. Kuhn. There was a lot of discussion at one of the meetings on pressure regulators on appliances, following a paper read on

AT LEFT: R. A. Hendrickson, Crane Co., Chicago; Charles H. Koinm, The Gas Service Co., Kansas City; H. W. Pope, Panhandle Eastern Pipe Line Co., Kansas City; E. C. Brenner, Milwaukee Gas Light Co., Milwaukee; W. E. Kemen, Milwaukee Gas Light Co., Milwaukee. RIGHT: C. M. Stephens, Council Bluffs Gas Co., Council Bluffs; Willard G. Wiegel, Lone Star Gas Co., Dallas; W. M. Little, Arkansas-Louisiana Gas Co., Shreveport; L. L. Dyer, Lone Star Gas Co., Dallas; A. W. Breeland, Lone Star Gas Co., Dallas.

this subject by H. L. Masser. "Low Cost Housing and What It Means to Gas and Electric Utilities" was discussed by G. H. Boyd and E. G. Watkins. Lee Holtz talked on "Tool Control" and W. R. Wood on "Treatment of Sour Gas." K. R. Knapp presented the A.G.A. Laboratories study on boltless couplings. Committee reports were presented by A. W. Fuller, C. C. Simpson, E. G. Campbell, and W. M. Little. An open forum on "Ordinances Regulating the Installation of Gas Appliances" was led by H. W. Geyer.

Charles R. Bellamy, Columbia Gas & Electric, reviewed some of the encouraging developments in air conditioning of the past few years in his address, "The Company Program for the Sale of Summer Air Conditioning."

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The stag affair of the natural gas industry has advanced to a higher level with this year's and last year's "Stag Open House." Various manufacturers of the industry provide the party. Plenty of good wholesome food was served. Mark D. Gilbert, Pittsburgh Equitable Meter Co., was chairman of this year's event. It seemed that every man who registered attended the party.

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L. S. REAGAN, vice president, Webster Engineering Co., Tulsa: "*Many years of selling and engineering industrial gas burning equipment proves to me that: (1) The management must be sold on the value of the industrial load. (2) The industrial department head must be a man who breeds confidence; second, an engineer. (3) You must have an engineering department or an engineer thoroughly conversant with the combustion of all fuels. (4) You must pay your industrial salesmen and engineers a wage that will enable you to pick the best and hold them. (5) Do not oversell gas. Remember, in an industrial installation you are dealing with a cold-blooded engineer and he knows when he is saving money, either in B.t.u. savings, intangibles, or better products. (6) Sell or recommend equipment that will do the job best, regardless of the cost. (7) Have your proposal in such shape that figures are correct and can be proven by other installations, etc. (8) Have your proposal prepared in a neat manner with binders, etc. Make it clear and concise. Attach well-drawn prints showing the proposed changes, etc. (9) There has been much said about intangible savings: cleanliness, increased production, increased time for maintenance, improvement of product, and smoke elimination. In presenting these savings don't just throw them in, but have a definite figure for them. (10) The matter of labor savings is in a great many cases a big item in favor of gas, but my experience shows that many a gas installation has been lost when the labor-saving item was stressed and not properly handled.*"

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Max Watson, Canadian River Gas Co., said that everybody was talking about the Underground Storage Symposium featured at the Production Conference. (See Page 23.)

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The Industrial Section always seeks to bring an outside viewpoint of some leading industrialist to its program, with this year's keynote address being given by W. L. Childs of Reed Roller Bit Co., Houston. His topic was "Basic Trends in Industrial Marketing." D. W. Reeves spoke on "Economics of Modern Gas Engine Power," George M. Parker on "An Analysis of New Industrial Gas Applications." L. S. Reagan gave a review and report on the "Present Status of the Code for Installation of Burners in Large Power Boilers," and later appeared on the program with "Some Points on Selling Industrial Gas." T. J. Gallagher came from Chicago to speak on "The Hotel Restaurant and Bakery Loads." Walter N. Ford and Carl A. Renz dealt with the two subjects, "Cooperating with Outside Promotional Agencies to Develop New Industrial Gas Customers" and "Servicing Industrial and Commercial Gas Equipment." Harry W. Smith, Jr. spoke on "National Publicity, National Advertising — A Powerful Program for Industrial Gas Sales." He illustrated his talk with many pieces of industrial material.

Franklin T. Rainey, chairman of the section, presided over one of the conferences, and H. Carl Wolf, vice chairman, took the gavel for the second conference.

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The gas companies of Houston were hosts at a very enjoyable affair one night of the conference. The Stag Open House, the Ladies Luncheon at San Jacinto Inn and the Grand Ball were other features. Mr. and Mrs. Elmer F. Schmidt entertained informally the night of the Grand Ball.

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The roof garden affairs atop Hotel Rice were most enjoyable. The roof-view of Texas' largest city was most inspiring.

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The city newspapers of Houston gave the conference more publicity than any set of newspapers has ever given the conference. Practically every issue of all papers carried factual stories and feature stories. A signed story of Rivers Reaves, oil editor of one of the papers, said: "As little as one might think, gas is a very important industry. It never dawned upon me until now — the time of the convention — that much of the daily life of people depends upon this important resource — gas."

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The convention reached out a long way this year in attracting delegates. They came from Texas, Alabama, Arkansas, California, Colorado, Connecticut, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Jersey, New Mexico, New York, Ohio, Oklahoma, Cuba, Mexico, Canada, Pennsylvania, Rhode Island, Tennessee, Utah, West Virginia, and Wisconsin.

AT LEFT: Allen D. McLean, Pittsburgh Equitable Meter Co., Pittsburgh; D. K. Hutchcraft, Clark Bros. Co., Inc., Tulsa; Mr. and Mrs. L. W. Jackson, Canadian River Gas Co., Channing; G. M. Kirkpatrick, Blaw-Knox Co., Pittsburgh; Dudley Hill, Foxboro Co., Foxboro. RIGHT: Charles R. Zeskey, Pittsburgh Equitable Meter Co., Kansas City; B. H. Gardner, Columbia Engineering Corp., Columbus; Ray T. Ratliff, Kansas City Gas Co., Kansas City; R. M. Bussard, Natural Gas Pipeline Co., Chicago.

Some Experiences With Gas Air Conditioning

A. B. BANOWSKY, the United Gas Corp., Houston, Texas, in a paper, "Experiences With Representative Air Conditioning Installations Utilizing Gas," presented before the Industrial Gas Section of the Southern Gas Association Annual Convention, which was held at the Arlington Hotel at Hot Springs, Arkansas, February 12, 13 and 14, 1940. — (Abstract by GAS.)

THE experiences outlined are based on observation of one company and its affiliated companies operating in Texas, Louisiana, and Mississippi from 1934 to the present. The geographic locations of the installations observed are in 11 towns. One group of them can be said to be in a belt about 150 miles in from the gulf coast and includes Beeville, Texas, near Corpus Christi, Houston, Huntsville, Beaumont, and Orange, Texas, Lake Charles and New Iberia, La. The second group of towns range further inland from the coast and start at Longview, Texas, extending to Shreveport and Monroe, La., to Laurel, Miss. In this area summer temperatures range between 90° and 100°, with relative humidity frequently reaching 80%. Conditions have also been observed in a territory in North Texas just east of the Panhandle where summer temperatures of 100° to 110° are encountered with comparatively low relative humidity.

In 1934 a competent engineer was first assigned to full-time work on air conditioning research and installation. The first installation, made at Beeville, Texas, in 1935, was with silica gel for dehumidifying and sensible heat removed by a compressor driven by electricity generated by a gas engine. Since that time experience has included the compressor engine ice machine combination, Ford V-8 engines driving a compressor on a contractor's installation, and in 1938 the first direct-fired Williams unit. In 1939 one of the three Servel units installed in that year was installed in Houston, one of the others being the All-Gas Home at the World's Fair. This experience also includes installation of one of the earlier Mills Novelty three-ton units. Late in 1939 two Kathabar dehumidifying units were installed in this area.

Perhaps the most important experience in this period was the beginning of direct selling of Williams Air-O-Matic equipment early in 1939. This effort on Williams equipment has resulted in installation of over 600 tons to date, including 11 jobs sold to customers totaling 375 tons. A ton in this instance represents 12,000 B.t.u. of heat gain per hour.

All of these varied types of air conditioning methods work. It is a waste of time to talk between ourselves, or to discuss with engineers, architects or customers whether these methods will work to produce satisfactory conditions at reasonable operating costs. Practical experience has demonstrated that satisfactory results can be obtained from all of these methods.

The question is—what are we going to do about it? No single manufacturer or sponsor of any method is in a position to do the whole job of pioneering and selling the market for their equipment. The remainder of this paper will be devoted to telling something of the reasoning of one company and what they are trying to do, and something of the success they are meeting.

Dehumidification equipment is only one part of the job, so this can be omitted until some conclusion is reached with reference to how sensible cooling is to be provided. Summer water temperatures in our area are too high to attempt dehumidification in connection with water cooling. How, then, is the basic cooling to be done?

For at least five years we have been talking about gas engine drives, yet in only a few instances have we induced any air conditioning contractor or engineer to go in for gas engine drive.

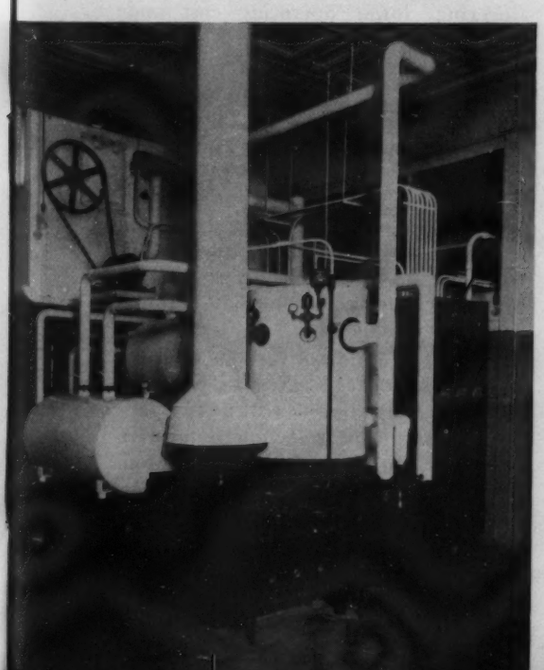
There must be a reason why no faster progress is made. In our own experience with proper weekly inspection and mechanical attention, we have one engine which was carefully engineered which was installed in 1935, with very little maintenance since that time. An engine compressor ice machine combination with competent mechanical inspection has operated for several years with complete satisfaction. Another installation without the regular inspection has been discontinued. A contractor's installation where the customer insisted on engines was powered with a Ford V-8. This engine wore out in the middle of the second season. While the customer debated buying a more expensive engine, the power company obligingly loaned a second-hand motor which they offered to sell at a very cheap price. There went one of our gas air conditioning jobs by the board.

A reciprocating compressor has many moving parts. A gas engine has more. With full realization that certain applications are economically practical for engines, we must admit that they add either maintenance or labor and will not stand careful scrutiny of the economics in many cases. This is the fact that has prevented more general acceptance of this idea. Proof that independent engineers are unbiased in this respect is best illustrated by the fact that in certain large instances they are coming out with steam turbine drives as the answer. Obviously the engineers are not entirely prejudiced and they recognize the operating cost problem just as much as we do.

If we were to keep placing our reliance for air conditioning business on engines, I believe we will still be talking wishfully about summer air conditioning in 1950.

Where else can we turn? Other things have been happening in the last 10 years. Scientific men have been brushing up on the theory of absorp-

United Gas Corp.'s gas air conditioning installation in the district office at Monroe, La.



Visitors to the corporation's New Iberia (La.) district office can learn of the benefits of air conditioning with gas.

tion which was the earliest refrigeration method and which has been so successful in domestic refrigeration. New refrigerants and solvents have been developed. In 1938 our company found successful installations three and four years old with little or no maintenance cost in that period. At that time, however, the absorption systems in use were designed for connecting to steam heating boilers in climates where the heating loads were as large as the summer cooling load. In our area summer cooling is much larger than the heating load, making impossible the use of existing boilers in most cases, and we have comparatively few boilers anyway because of the lack of the heating load.

Making a Market

Why not a direct gas-fired absorption installation? That was the problem we put to the manufacturer. The first such unit was built and installed in 1938. It worked. But we were still faced with the problem of making a business out of gas air conditioning; making a place, if you please, for gas air conditioning in a market which can best be described as chaotic; a market where every retail dealer buys at a distributor's price and where the cheapest price was the principal and frequently the only selling appeal known.

Fortunately, the air conditioning industry is moving into a period of revolutionary change. A lot of buyers are profiting by the mistakes of their neighbors. The purchaser is realizing that he had better appoint a competent purchasing agent, and it is our observation that the consulting engineer is rising in importance. His principal service at this time is to reassure the customer that he gets more satisfaction by paying enough to get an adequate job. The consulting engineer knows how to get an adequate job by giving the business to the air conditioning contractor with the best record of successful installations. That may work to your disadvantage if you are just going into air conditioning or beginning to sponsor some dealer. Do not mark the consulting engineer off your list when he keeps giving his business to an old established concern. It is our experience that the consulting engineer is conscientious, and while he is a good purchaser for his client and may be hard to deal with, he is open to proof that you have something better for the job at hand.

This proof is where the company office installation comes in. That is the quickest way to get proof to engineer and customer alike that you have a means for installing successful air conditioning. However, do not expect the company office installation to sell business. In three towns where the company office installation was the first installation made either in 1938 or early in 1939, we have not yet sold another job in those towns, and it is not because we do not have successful installations at those points. It seems that the office installation encourages local sales people to "wait and see." The "wait and see" course doesn't mean immediate sales. Maybe that is the safest course, but for immediate sales, do not depend on an office installation.

Another thing that cannot be done is to turn equipment prices over to your sales manager and let him apply his usual mark-up. Air conditioning as practiced today is not merchandising. Air conditioning is contracting, and you may have to learn how to bid on jobs as you are learning how to estimate them. However, one of the greatest contributions the gas utilities are going to be able to make is to develop means for getting in some selling after the bids are in. You must demonstrate that operating costs will be 25% to 40% cheaper than today's accepted method. You must be able to show how few moving parts and lower refrigerant pressure mean less machinery maintenance and far less refrigerant loss. We are still groping for effective means of dramatizing these points. Not only is there a sales job to be done on the concern already determined to buy air conditioning, but the biggest sales job that lies ahead is in demonstrating that air conditioning is a practical service for many people, both in business and in the home, who do not now think they could possibly have an installation.

However, behind selling is something of more basic importance, and that is proper engineering. This cannot be turned over to your heating or industrial engineer as a part time job. It will take at least one competent man full time to make any showing. For what we have done in the last year we have had from four to six men for all of their time at certain seasons of the year. Instead of having a separate engineering department in our sales department, all of these engineers except the air conditioning engineer and his assistant are located in our regular engineering department. Engineers are needed to calculate load, select fans, coils and cooling towers of proper size. All that is part of getting a successful job. We have found that adequate and competent supervision of installation is the cheapest investment you can make in an installation.

A Tailor-Made Job

Perhaps the reader is thinking "Get down to some facts." "What does it cost per ton?" An answer to that question would mean very little. Each air conditioning job is still tailor made. The requirements for each job depend on engineering specifications and customer requirements. A recent bid of $495 per ton was considered in line. We have sold air conditioning for prices ranging from about $200 per ton for 55- and 60-ton jobs, to nearly $400 per ton for 10- and 12-ton jobs, and in every case except one we got more than others bid on the job. The difference has to be sold on the basis of a better job — due to care in engineering, lower operating cost and lower maintenance.

Maintenance is the point on which we probably have least definite information at this time. We have had practically none on finally completed operating installations except adjusting them to the first heating season. With so few moving parts and low refrigerant pressures that prevent refrigerant loss, there is no reason to expect a material amount of maintenance for a long time.

Operating costs are very easy to determine, if you can agree on per cent of time the installation will be in operation. Equipment selection data will indicate 25 to 26 cu. ft. of gas per ton per hour. Actual operation shows 21 to 23 cu. ft. per ton per hour, perhaps because of difficulty in exactly evalu-

ating load factor and actual hours of operation. Electric requirements are about .4 kw. per ton per hour, although this can be easily calculated from the connected horsepower. The connected horsepower of motors originates from the fan motor, the solution pump motor, chilled water motor and the cooling tower pump. Water consumption in an atmospheric tower is about 2½ gals. per ton per hour. All these requirements at prevailing rates have given for actual conditions from 9 mills per hour for a calculated ton for a 60-ton job, to 2½ cents per hour for a calculated ton for a 12- to 15-ton job. For an installation requiring 100 to 150 M c.f. per month, such as about a 25-ton job will require, it will take 35 cents to 40 cents per thousand for natural gas for the gas to make enough inducement to pull the prospect to the gas installation on strict economic consideration.

We sell our jobs principally for year-round air conditioning. The Williams unit evaporator coil now is located in a water chiller from which chilled water is circulated to coils in the air handling unit for cooling. We have used both a steam heater in this chilled water line and have circulated hot water through the cooling coil for winter, and have also used a steam hot blast coil as an auxiliary in the air handling unit for winter heating. In both cases steam is supplied by the steam generator used for the summer cooling. For most cases we have come to prefer the steam blast coil to the heater in the chilled water line, although both work satisfactorily.

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Indiana and Ohio Investors Acquire Kokomo Utility

The Peoples Gas Subsidiary Corporation of Illinois and the Indiana Natural Gas & Oil Co. have sold their ownership of the Kokomo Gas & Fuel Co. to a newly-formed group of investors in Kokomo, Ind., and Columbus, Ohio.

Lewis A. Conradt, Donald F. Elliott, Charles R. Love, and D. A. Williams of Kokomo, and Samuel D. Whiteman, Ralph Beaton, and Charles J. Kurtz of Columbus are the board of directors of the new company.

The gas utility was established in 1875. Edward H. Haun, general manager, Glen R. Hoss, sales manager, and J. E. Deegan, distribution superintendent, have been retained by the new owners to continue in their same positions.

■ ■

Gas Conversion Started In Napoleon, Ohio

The Ohio Gas, Light & Coke Co., of Bryan, Ohio, have started work on the conversion of their manufactured gas system to natural gas in the town of Napoleon. Twenty-four workmen are handling the conversion job. Commercial appliances were the first to receive attention, and workmen later started converting household appliances.

The Manufacture of High B.t.u. Gas For Peak Loads and Standby Needs

• ONE OF THE PROBLEMS that most frequently presents itself, incidental to the distribution of natural gas, is the provision of standby gas production facilities to guard against unusual or unforeseen peak loads or temporary reduction of the transmission line deliveries. Such standby facilities can often be provided by modification of gas manufacturing apparatus already installed within the distribution area, and considerable ingenuity has been displayed in this regard in numerous instances. The manner in which this problem was met in New Orleans was described in a paper, "The Manufacture of High B.t.u. Gas for Peak Load and Standby Purposes," by H. M. BLAIN, JR., superintendent, Gas Production Division, New Orleans Public Service, Inc., New Orleans, La., which was presented before the Joint Conference of the A.G.A. Production and Chemical Committees at the Hotel Pennsylvania, New York City, May 20-22, 1940. — (Abstract by G A S.)

SOON after New Orleans first began using natural gas, experiments were carried on at the gas plant to determine the best interchangeable gas that could be made using a carburetted water gas set. The problem was to make a minimum 950 B.t.u. gas interchangeable with natural gas of the following proximate analysis:—

CO_2	0.24%
O_2	0.55%
CH_4	94.60%
N_2	4.61%
	100.00%
Calculated B.t.u.	960
Calculated Specific Gravity	.5786

From 1935 to the present day, manufactured gas has been produced each winter for peak loads using three types of operation, namely: (1) Koppers Process with reversed Air Blast, (2) Refractory Screen Process and (3) Single Stage Oil Cracking. Some very interesting results have been obtained. The latter method of operation has proved very satisfactory and is explained herewith with actual operating data.

This method has been labeled Single Stage Oil Cracking because all the process oil is subjected to only one stage of cracking to form the resulting finished gas. The greater amount of oil is sprayed into the generator instead of the carburetor and cracked on top of a lower refractory bed with sweep steam. Simultaneously, oil is cracked in the carburetor and the resulting finished gas is held to 950 B.t.u. by increased checkers and heats. Gas oil is used in both the generator and carburetor for smoke elimination.

A diagrammatic drawing of this type of operation is shown in Fig. 1. The changes made in the Refractory Screen Set for single stage operation are as follows:

1. A 30 in. generator refractory bed in place of 3 ft. 9 in. topped with three rows of checkers.

2. Installation of sweep steam connections over the generator bed.

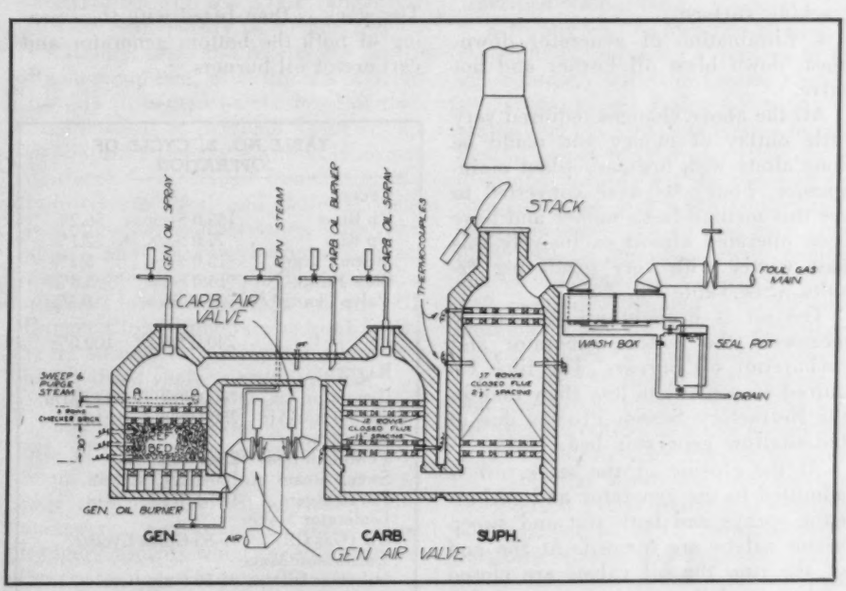

FIG. 1. Diagrammatic layout of single stage oil gas process.

TABLE NO. 1. RESULTS WITH SINGLE STAGE PROCESS

Run Number	*1*	*2*	*3*	*4*	*5*	*6*
Hours of Operation	6.25	10.00	9.00	4.00	7.50	5.00
Total Set Hours	18.35	36.30	30.36	9.90	24.37	10.43
Total Gas Made — M c.f.	3031	6143	5468	1814	4383	1877
Make per Set Hour — M c.f.	165	169	180	183	180	180
Make per Run — M c.f.	11.02	11.29	12.02	12.25	12.01	12.03
Average B.t.u.	965	958	948	940	953	942
Generator Make Oil per M c.f.	7.23	7.20	6.94	6.87	6.80	6.98
Carburetor Make Oil per M c.f.	3.54	3.77	3.88	3.71	3.56	3.65
Generator Heat Oil per M c.f.	0.61	0.61	0.54	0.56	0.54	0.62
Carburetor Heat Oil per M c.f.	1.11	1.16	1.13	1.13	1.11	1.12
Total Oil per M c.f.	12.49	12.74	12.49	12.27	12.01	12.37
Total Steam per M c.f.	25.20	24.60	23.10	22.70	23.10	23.10
Ratio — Lbs. Steam/Lbs. Oil	.242	.233	.222	.223	.232	.227
Average Generator Oil/Cycle	79.70	81.30	83.40	84.00	81.80	84.00
Average Carburetor Oil/Cycle	39.10	42.60	46.60	45.50	42.80	44.00
Average Bottom Generator Temperature °F.	2135	2150	2130	2130	2110	2165
Average Middle Generator Temperature °F.	2090	2070	2120	2110	2110	2075
Average Top Generator Temperature °F.	2010	2000	2055	2065	2035	2025
Average Carburetor Temperature °F.	1735	1785	1780	1775	1750	1765
Average Middle Superheater Temperature °F.	1500	1525	1525	1520	1515	1515
Average Top Superheater Temperature °F.	1530	1540	1545	1575	1560	1565
Average Cross Over Temperature °F.	1280	1290	1290	1240	1235	1260
Gas Analysis — CO_2	2.11%	2.01%		1.72%	1.34%	2.03%
Ills.	24.11	23.31		21.10	20.40	22.18
O_2	1.05	0.37		1.54	0.89	0.91
H_2	21.50	22.22		25.21	24.05	22.59
CO	1.93	1.82		1.72	1.91	1.22
C_2H_6	0.47	.....		.....	.....	.....
CH_4	38.50	39.55		40.65	40.46	39.90
N_2	10.33	10.72		8.06	10.95	11.17
Calc. B.t.u.	1045	957		931	912	937
Calc. Sp. Gr.	.6913	.6821		.6444	.6509	.6758
"C" Factor	.923	.847		.847	.804	.818
Naphthalene — Grs./100 Cu. Ft.	.....	..		4.82	.....	.....
H_2S — Inlet Boxes	.....	152	148	.....	.....	.....
H_2S — Outlet Boxes	.....	4	3	.....	.....	.....

3. Closer spacing of carburettor and superheater checkers to increase the cracking surface.

4. Elimination of generator down-blast, down blast oil burner and hot valve.

All the above changes required very little outlay of money and could be done along with ordinary plant maintenance. Four sets were converted to use this method last summer and have been operated almost exclusively this past winter with very gratifying results. (See Table No. 2.)

The set is brought up to heat by means of the bottom generator and carburettor oil burners. The time required is somewhat less than that in the Refractory Screen Process due to the shallow generator bed.

At the closing of the stack, oil is admitted to the generator and carburettor sprays and both run and sweep steam valves are opened. At the end of the run, the oil valves are closed and steam left on for the purge, followed by an air purge from both the generator and carburetor air valves. The stack is then lifted with the opening of both the bottom generator and carburetor oil burners.

TABLE NO. 2. CYCLE OF OPERATION

CYCLE:		
Up Blast	135.0 Secs.	56.2%
Up Run	77.0 Secs.	32.1%
Steam Purge	13.0 Secs.	5.4%
Blow Purge	14.0 Secs.	5.8%
Valve Change	1.0 Secs.	0.5%
	240.0 Secs.	100.0%
RATES:		
Generator Air	7000-8000 Cu. Ft./Min.	
Carburetor Air	7500-9000 Cu. Ft./Min.	
Run Steam (Through Bed)	25-50 Lbs./Min.	
Sweep Steam	100-125 Lbs./Min.	
Purge Steam	150-175 Lbs./Min.	
Generator Make Oil (Gas Oil)	75-85 Gals./Cycle	
Carburetor Make Oil (Gas Oil)	35-50 Gals./Cycle	

With the past winter's operations, we have found this operation to offer the following advantages:

1. Simplified operation with no down blast or hot valve.
2. Less maintenance required on generator arches and refractory bed.
3. Better quality and more tar produced.
4. More capacity per set.
5. Ease of B.t.u. and specific gravity control.
6. Better gas for interchangeability with natural gas.
7. Positive elimination of smoke during the blasting period.

Table No. 1 shows some typical operating results using this single stage process.

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FPC Orders Natural Gas Properties Reported

The Federal Power Commission announced that natural gas companies subject to its jurisdiction are required to furnish information on their history, acquisitions of gas operating units or systems, their original cost, and other supplemental data in connection with gas plant instruction No. 2-D of the Commission's uniform system of accounts under the Natural Gas Act.

Statements to be furnished cover nine different factors in gas plant accounts, including: origin and development of each company; original cost as of the date of each acquisition; amount determined by appraisals in gas plant accounts in lieu of cost; statement showing in detail gas plant as classified in the books of account immediately prior to reclassification, and statement showing gas plant as of January 1, 1940, classified as prescribed in the uniform system of accounts.

■ ■

San Diego Co. Relinquished By Parent Holding Company

The Standard Gas & Electric Co., Chicago, will soon relinquish its controlling interest in the San Diego (Calif.) Consolidated Gas & Electric Co., according to information contained in the parent company's annual report for 1939. The Standard Gas & Electric Co. is a holding concern for several companies, one of which is the San Diego utility.

Early this year, the Securities and Exchange Commission at Washington issued an order requiring a plan for integration of the properties of the Standard Gas & Electric Co. The Standard company has recently requested of the SEC an extension of 60 days in which to comply with the order to integrate.

■ ■

Production and Chemical Committees, A. G. A., Meet

The production and chemical committees of the American Gas Association met in joint sessions May 20-22 at the Hotel Pennsylvania in New York City for a series of round table discussions and to hear papers delivered during the three-day conference. Chairmen in charge of committee activities were W. K. Beard, Philadelphia Gas Works Co., Philadelphia, and S. J. Modzikowski, Peoples Gas Light & Coke Co., Chicago. Also, there was given a report of the air conditioning committee by Chairman L. J. Willien.

Top honors in the national competition for leadership of the CP Ranger Club during 1939 were monopolized by the salespeople of Barker Brothers, large Los Angeles department store. From left to right are Ralph E. Nelson (145 sales); Robert E. Slater, National Adjutant (157 sales); Mrs. Cora Riegelman, National Commander (280 sales); James W. Dulon (over 100 sales); and Edmund Vojae, National Vice Commander (227 sales).

CP Ranger Club Announces Plans For a Greater 1940 Program

WITH sales of CP gas ranges 40 per cent higher in the first two months of this year than in the same months of 1939, America's gas range salesmen are competing for membership, honors and awards in the "CP Ranger Club," a national sales fraternity organized in 1939 by the American Gas Association. This club was designed to set nation-wide standards for "Certified Performance" salesmanship and to provide recognition for outstanding sales accomplishments.

In 1939, more than 10,000 gas company and dealer salesmen from 48 states and Canada competed for honors in the CP Ranger Club, according to George L. Scofield, chairman of the American Gas Association National Range Committee. Two hundred seventy-five gas range salesmen achieved membership in the club by selling at least 25 CP models, in addition to other ranges, during the 1939 calendar year. By leading all other salesmen in the country, with a total installation of 280 CP's, Mrs. Cora Riegelman, of Barker Brothers, Los Angeles, Calif., clinched the title of "National Commander" of the CP Ranger Club for 1940. Barker Brothers won further honor when two other members of its sales force, Edmund Vojae and Robert E. Slater, won the honorary posts of "National Vice Commander" and "National Adjutant," with 227 and 157 sales, respectively.

Regional commanders for 1939 (sales in parenthesis) are:

Ralph E. Nelson (145), Barker Bros.. Los Angeles.

William J. Pender (137), Elizabethtown Consolidated Gas Co., Elizabeth, N. J.

Burt J. Coulon (82), Atlanta Gas Light Co., Atlanta, Ga.

Harry Greenwood (71), Michigan Consolidated Gas Co., Grand Rapids, Mich.

Goodman Overton (69), Western United Gas & Electric Co., Aurora, Ill.

Harlan D. Burnside (61), Minneapolis Gas Light Co., Minneapolis, Minn.

Mrs. Alice Mangan (60), Brooklyn Union Gas Co., Brooklyn, N. Y.

Troy B. Jackson (55), Dallas Gas Co.. Dallas, Texas.

Herbert P. Burgess (54), Roanoke Gas Co., Roanoke, Va.

C. H. Manney (44), Gas Service Co., Fort Scott, Kan.

George H. Porter (40), Bridgeport Gas Light Co., Bridgeport, Conn.

Charles D. Parks (40), Northern Indiana Public Service Co., Hammond, Ind.

Larger awards for 1940 will be announced in "The CP Ranger News," a publication distributed quarterly to all registered gas range salesmen. These awards will include eight free all-expense trips, 24 cash prizes and 15 handsome trophies for gas companies, gas company and dealer salesmen and sales executives.

For the purpose of this nation-wide competition, the United States has been divided into eight geographic regions. Gas company and dealer salesmen will compete for regional as well as for national honors and awards. Gas company salesmen in each region with the greatest number of CP ranges installed by September 30, 1940, will receive a trip, with all expenses paid, to the American Gas Association National Convention at Atlantic City next fall. Three cash prizes will be awarded dealer salesmen in each of eight regions.

Salesmen who sell 25 CP ranges during the year qualify as members of the CP Ranger Club and receive the bronze Ranger emblem, a certificate of membership presented by the head of their organization, a personal letter of appreciation from the national chairman of the A. G. A. Range Committee, and publicity in local and national trade journals. Sales supervisors, sales managers, and dealers become Rangers when one-half the men they supervise qualify for membership in the CP Ranger Club. Rangers who qualify two years successively receive a silver emblem; three years, a gold emblem.

For 50 or more CP gas range sales in any one year, salesmen receive the title of "Star Ranger" and their emblems are set with a diamond for each year they qualify. Supervisors, sales managers, and dealers earn "Star Ranger" awards when three-fourths of their sales force become Rangers.

Those who maintain their Ranger status by selling 25 CP ranges each year for four successive years win the rank of "Royal Ranger." Star Rangers for four successive years become Royal Star Rangers. Both classes receive distinctive emblems and personal recognition for their consistent achievements.

To promote competition among gas companies, two activities have been set up — one on a regional and one on a divisional basis — and 15 CP Ranger Victory Trophies will be given to sales leaders. The Victory Trophy is a silver figure of a mounted ranger set on an inscribed walnut base.

A trophy will be awarded in each of the eight geographic CP regions to the gas company with the largest number of company and dealer CP range installations per 1000 gas meters in residential homes for the year 1940. Seven divisional awards will be given to gas companies. To assure fair competition, divisions are set up so that each company will be competing with companies of about its own size.

A recent development in the CP promotional campaign was the announcement by Lloyd C. Ginn of the Association of Gas Appliance and Equipment Manufacturers, of the release to key utility sales outlets of a new sound film in technicolor, "The Parade to Profits." The film is not for sale, but can be obtained gratis at the 100 clearing points named in the CP spring-summer portfolio released last February. Additional information may be obtained from the A. G. A. E. M.

A. G. A. Committee on Domestic Research Distributes Water Heating Bulletin

FOR the past several years the American Gas Association has through its Committee on Domestic Gas Research carried on a program of basic research on domestic gas appliances, with the object of making available technical data that could be employed by gas appliance manufacturers and engineers in improving efficiencies and other performance characteristics of such equipment. On May 22, 1940, "Fundamentals of Domestic Gas Water Heating," Bulletin No. 9, was published and distributed to gas company and water heater manufacturer company members of the Association.

This bulletin includes results of research on gas water heaters designed for domestic use, conducted at the A.G.A. Testing Laboratories. It is one of a series of four bulletins summarizing the investigational work for the Committee on Domestic Gas Research, of which F. J. Rutledge, vice president of the United Gas Improvement Co., is chairman. Two of these bulletins, Nos. 7 and 8, cover gas ranges and No. 10 deals with design of atmospheric gas burners. Bulletin No. 7 was published several years ago and bulletins Nos. 8 and 10 will be distributed as soon as they have been released by the Committee on Domestic Gas Research, for publication.

Representing the culmination of research extending over approximately three years, Bulletin No. 9 on fundamentals of domestic gas water heating covers comprehensively a large number of subjects relating to design, selection, and installation of water heaters. A chapter on heat losses from external surfaces of automatic types of water heaters, summarizes results obtained from different types of insulation materials commonly used. Some of the factors involved are the type, thickness, and density of insulation.

Of vital importance in the design of automatic storage gas water heaters are the combustion chambers and flueways. These factors are discussed in Bulletin No. 9, and results showing the effect of combustion chamber and flue design on heat transfer characteristics are included.

Three other chapters dealing with heat losses through piping and heat traps attached to water heaters, standby losses and service efficiency of automatic storage water heaters round out this bulletin. It includes such information as methods for selection of proper sized heaters for given hot water requirements and optimum service which will afford better gas service to consumers.

Copies of Bulletin No. 9 are available at the A.G.A. Testing Laboratories, 1032 East 62nd Street, Cleveland.

■ ■

Northern Natural Co. Plans Kansas and Nebraska Loops

Northern Natural Gas Co., of Omaha, Neb., has recently announced its plans to construct four loops along its system extending from Texas to Minnesota. The loops will be laid in Kansas and Nebraska. An order for 60 miles of 24-in. pipe has been placed with the National Tube Co., and other orders for approximately 49 miles of 12-in., 10-in., 4-in., and 2-in. pipe were given to Youngstown Sheet & Tube Co. and Republic Steel Corp. The pipe will be delivered this month.

■ ■

Huge Arkansas Well Drilled

At a depth of 164 ft., a gas well was blown in recently near Boston, Madison County, Ark., producing 20,000,000 cu. ft. per day. According to Dr. George C. Branner, state geologist, the well is most unusual, as the normal yield from a well of that depth is but a few thousand feet daily.

CALENDAR

June

American Home Economics Association—Hotel Statler, Cleveland, Ohio, June 23-27.

New England Gas Association, Operating Division—Spring meeting, Hotel Viking, Newport, R. I., June 7.

Public Utilities Advertising Association—Annual Convention Palmer House, Chicago, June 23-26.

July

Canadian Gas Association—Annual Convention, Jasper Park Lodge, Alberta, July 3-5.

Michigan Gas Association — Annual Convention, Grand Hotel, Mackinac Island, Mich., July 8-10.

Pacific Coast Gas Association Northwest Conference — Held in conjunction with Canadian Gas Association, July 3-5.

August

Appalachian Gas Measurement Short Course—Third annual meeting, University of West Virginia, Morgantown, Aug. 19-21.

September

Empire State Gas and Electric Association — Annual Convention, Westchester Country Club, Rye, N. Y., Sept. 26-27.

Pacific Coast Gas Association—Annual convention, Hotel del Coronado, Coronado, Calif., September 18-20.

October

American Gas Association — Annual Convention, Atlantic City, N. J., week of October 7.

December

National Association of Railroad and Utility Commissioners—Miami, Fla., Dec. 10-12.

Canadian Association Plans Jasper Park Meeting

PLANS for the 33rd annual convention of the Canadian Gas Association, to be held at Jasper Park Lodge, Alberta, Canada, July 3-5, are rapidly being completed, it has been reported by George W. Allen, secretary-treasurer of the Association.

The Jasper Park Lodge consists of bungalows of various sizes surrounding a main building which houses lounges and offices. In addition to scenic motor trips, the park offers such recreation as horseback riding, fishing, swimming, hiking, golf, and tennis. Taking advantage of these many diversions, the program committee has included in the convention schedule some of the outdoor activities, among which is a golf tournament the afternoon of July 3.

Pacific Coast men taking part in the program include F. M. Banks, vice president, Southern California Gas Co.; LeRoy M. Edwards, president, Industrial Fuel Supply Co.; R. E. Fisher, vice president, Pacific Gas & Electric Co.; A. F. Rice, manager, Occidental Stove Co.; and J. F. Pollard, president, Seattle Gas Co. Several members of the Pacific Coast Gas Association are planning to attend the Jasper meeting.

Delegates are urged by Secretary Allen to make arrangements to arrive in Jasper on July 2 in order to be present for the evening entertainment planned for that evening. Reservations may be secured from the secretary, whose address is 7 Astley Ave., Toronto 5, Ontario.

■ ■

All-Gas Kitchen Featured In New Motion Picture

Another all-gas kitchen has been designed by Hollywood to be featured in a comedy called "Turnabout," produced by Hal Roach and released through United Artists. There are four kitchen sequences in the picture.

The publicity and advertising committee of the American Gas Association has issued a promotion folder offering suggestions for local gas companies to tie-in with the showing of the picture. The cover page of the portfolio carries the message, "Here's your opportunity to tell the world that when Hollywood builds an ultra-ultra kitchen, it chooses modern gas appliances exclusively."

Starred in "Turnabout" are Carole Landis, Adolphe Menjou and John Hubbard.

■ ■

Winnebago, Minn., Votes Natural Gas Franchise

A franchise has been granted to the Minnesota Valley Natural Gas Co. to serve natural gas to Winnebago, Minn., for the next 25 years, and it is expected that service will be ready by next fall.

The Winnebago system will become a link in the chain of Minnesota towns which will be supplied natural gas from the pipe line system of the Northern Natural Gas Co., of Omaha, Neb., which has constructed a line from Sioux City, Iowa, to Minneapolis.

■ ■

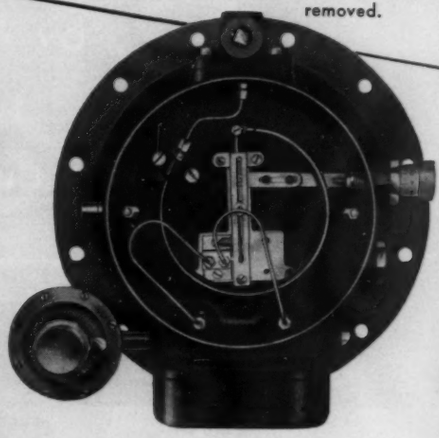
Retired Employe Dies

George H. Schunight, recently retired from the Louisville (Ky.) Gas & Electric Co., passed away April 8, at the age of 79. Prior to his retirement Mr. Schunight had been an employe of the company for almost 50 years. He started to work for the company reading meters, and for many years was in charge of the adjustment department.

Fisher

WIZARD PILOT OPERATED GAS PRESSURE REGULATORS

WITH THROTTLING RANGE ADJUSTMENT



Top View of Integral Mounting Type 4300 Wizard Pilot — cover removed.

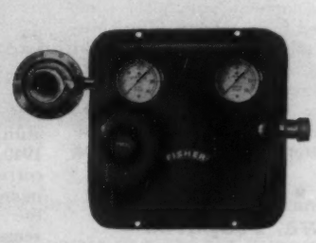
NEW • IMPROVED

★ An extremely sensitive gas pressure controller for High Pressure Distribution Systems, Town Border Stations, Boiler Gas Fuel Controls, and other similar services. Absolutely dependable and accurate to within 1% of the desired pressure setting. For use with Fisher Diaphragm Motor Valves which are especially designed for pilot operation. Consider these outstanding features of the new and improved Wizard Pressure Pilots:

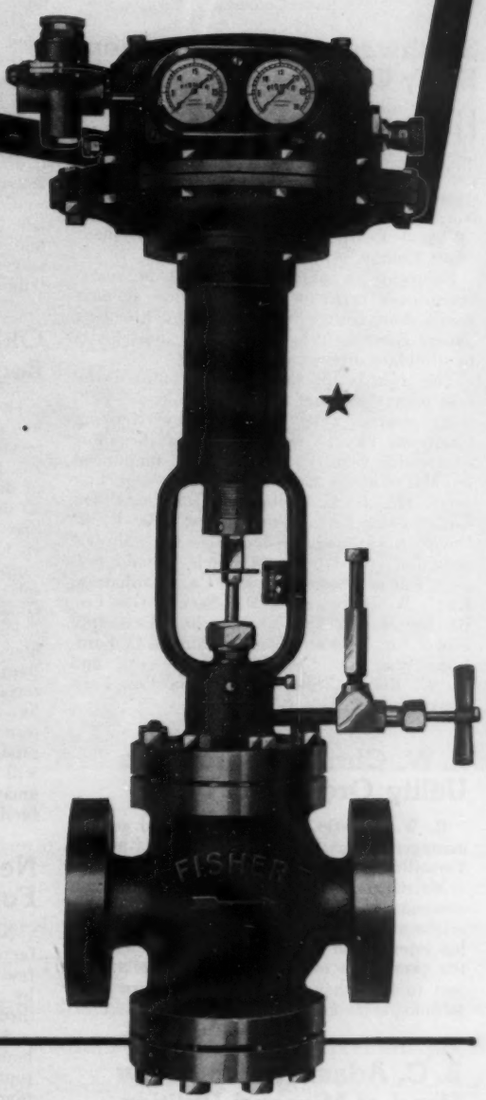
1. New built-in throttling range adjustment.
2. Vernier screw adjustment for controlled pressure setting.
3. Integral weather-proof housing for pressure gauges.
4. Larger and more sensitive Bourdon tube.
5. Gas-tight and weather-proof cases.
6. High pressure control connections and leads.
7. Easily changed from reverse to direct acting or vice versa — without changing Bourdon tube position.
8. Suitable for pressures up to 10,000 lbs.

WRITE TODAY for FREE Bulletin D1 containing complete information and latest prices.

FLUSH MOUNTING
Type 4100F Panel Mounting for remote control.



WALL MOUNTING
Type 4100S for surface or wall mounting remote control.



INTEGRAL MOUNTING— Type 4357T Controller with Type 4300 Wizard Pilot mounted integral with topwork of Fisher Diaphragm Motor Valve.

FISHER GOVERNOR COMPANY

805 FISHER BLDG. MARSHALLTOWN, IOWA

Retiring Chairman Fay C. Walters announcing the seven prize paper winners during the 1940 Gas Measurement Short Course.

Southwest Gas Measurement Essay Contest Closed

DEAN W. H. Carson, college of engineering, University of Oklahoma, recently announced that June 1 was the deadline for papers from those attending the 1940 Southwestern Gas Measurement Short Course, at Norman, Okla., April 16-18, on the subject "What I Learned at the Gas Measurement Short Course."

Following a practice of previous years, seven cash prizes will be awarded at next year's short course to those writing the best papers covering this subject. The purpose is to stimulate interest in the course.

The awards for those who submitted the best papers on what they learned at the 1939 short course were presented by Retiring Chairman Fay C. Walters during the short course this year. Those who were announced by Mr. Walters as the winners were: first prize, $15, R. L. Ledbetter, Continental Oil Co., Basile, La.; second prize, $10, P. R. Davis, Arkansas-Louisiana Gas Co., Shreveport, La.; third prizes, $5 each, Donald Biegert, Kansas Power & Light Co., Manhattan, Kan.; W. B. Bowen, Cities Service Gas Co., Bartlesville, Okla.; T. F. Larche, Mississippi Power Co., Jackson, Miss.; Thomas C. Ford, Lone Star Gas Co., Palestine, Texas, and D. W. Rhodes, Southern Carbon Co., Fairbanks, La.

■ ■

R. W. Christie, Vermillion Utility Organizer, Dies

R. W. Christie, vice president and general manager of the Vermillion Natural Gas Co., Vermillion, S. D., passed away on April 25.

Mr. Christie organized the Vermillion gas company in 1935 and had directed its operations since that time. He had also expanded his interests to other communities, including the promotion of a multi-million dollar project to furnish gas from southwestern fields to consumers near the Canadian border.

■ ■

B. C. Adams Named New Head of Missouri Utilities

Ben C. Adams, vice president and general manager of the Gas Service Co., Kansas City, Mo., was elected president of the Missouri Association of Public Utilities at the 34th annual convention, held recently at Excelsior Springs, Mo. Other officers elected were:

First vice president, D. W. Snyder, Jr., president, Missouri Power & Light Co., Jefferson City; second vice president, C. A. Semrad, St. Joseph (Mo.) Railway, Light, Heat & Power Co.; third vice president, W. B. Head, Jr., president, Missouri Public Service Corp., Warrensburg; secretary, N. R. Beagle, Missouri Power & Light Co., Jefferson City; assistant secretary, Jesse Blythe, Jefferson City; treasurer, Harry Warner, secretary-treasurer of the Gas Service Co.; and managing director, E. A. Beer, Jefferson City.

■ ■

Plans For 2300-Mile Line Modified By Kansas Co.

The Kansas Pipe Line & Gas Co. has recently asked permission from the Federal Power Commission to amend its application for a certificate authorizing the construction of a natural gas pipe line extending from Kansas to Minnesota. The amendment would change the route of the proposed 2300-mile line, the communities to be served, and reduce the cost of the initial investment.

The company's original application has been on file since September, 1938. The cost of the proposed line would be $14,550,000, of which $10,000,000 would be spent for main lines, $1,800,000 for branch lines, $1,090,000 for five compressor stations and other items such as crossings, pipe protection and dehydration plant. As listed in the amendment, 102 towns with a total population of 275,650 would be served as soon as the line was finished, and an additional 52 towns of approximately 52,866 total population would be served by branch lines to be built by distributors.

■ ■

Oklahoma Utilities Co. Begins 16-Mile Line

The Oklahoma Utilities Co., Bristow, Okla., has placed an order for pipe and other material for construction of its 16-mile natural gas pipe line which will connect its system in the Bigpond area with the Arlington field, 10 miles south of Stroud. Work on the new line was scheduled to start in May. Purpose of the construction is to guarantee a gas supply to Bristow, Drumright and Mounds, served through distribution systems by the Oklahoma Utilities Co.

R. C. Poage, of Bristow, manager of Oklahoma Utilities Co., announces that the company has contracted for gas from Allied Materials Corp., and the Shell Oil Co., and also has acquired some undrilled acreage of its own to further augment its gas supply. The pipe, ordered from Continental Supply Co., will be 9½ miles of 5-in., and the balance 4-in., the latter to serve for gathering facilities.

■ ■

Nevada, Iowa, Prepares For Gas Changeover

Natural gas will be substituted for manufactured gas in Nevada, Iowa, within the next few months, according to an announcement by the Iowa Electric Light & Power Co. through its local manager, Kenneth Kinsey.

At present a long pipe line from the Oklahoma oil fields passes near Ogden on its route to Minnesota. According to present plans, a new pipe line would be laid from Ogden to a point near Jordan, where the line would connect with the present gas line from Boone, where the present gas is manufactured. From there it is piped through Ames to Nevada.

A.G.A. Invites Applications For 1940 Honor Awards

MANAGING Director Alexander Forward of the American Gas Association is inviting applications for the 1940 Charles A. Munroe award, which should be filed by an individual or company member on or before August 1. The applications will be judged by a committee of three prominent gas company executives to be appointed by President Walter C. Beckjord, and will be passed on by the executive board. The presentation of this award, which is given to an individual who has made outstanding contributions to the industry's advancement, will be made at the Association's convention at Atlantic City next October. The award comprises an amount of money and a permanent certificate.

The gas industry is also reminded by Mr. Forward of its Meritorious Service Medal. This award consists of a gold medal and button and a certificate, and is the industry's recognition of the gas company employe who has performed the most meritorious deed during the year in saving human life. To qualify for the medal, also to be presented at the convention next October, the deed must have been performed during the period beginning July 1, 1939, and ending June, 1940. Applications for the 1940 award should be sent to Association headquarters on or before August 1, 1940. Forms for the application will be gladly furnished upon request of Association headquarters.

■ ■

Southern Natural Gas Co. Plans Pipe Line Extension

A $3,000,000 expansion program involving additions to its system in Mississippi, Alabama and Georgia has been announced by the Southern Natural Gas Co. with headquarters in Birmingham, Ala.

The program includes enlargement of compressing facilities and construction of approximately 80 miles of 22-in. transmission lines paralleling portions of the existing line from Monroe, La., to Atlanta, Ga. Branch lines will be constructed to Macon and Columbus, Ga., and Montgomery, Selma and Mobile, Ala. New transmission lines will supplement existing facilities and will increase maximum load of the company system by approximately 30,000,000 cu. ft. per day, an increase of approximately 15%, it was stated.

Work was to get under way on the $3,000,000 program during the month of May.

■ ■

Gas Industry Revenues Gain In February, 1940

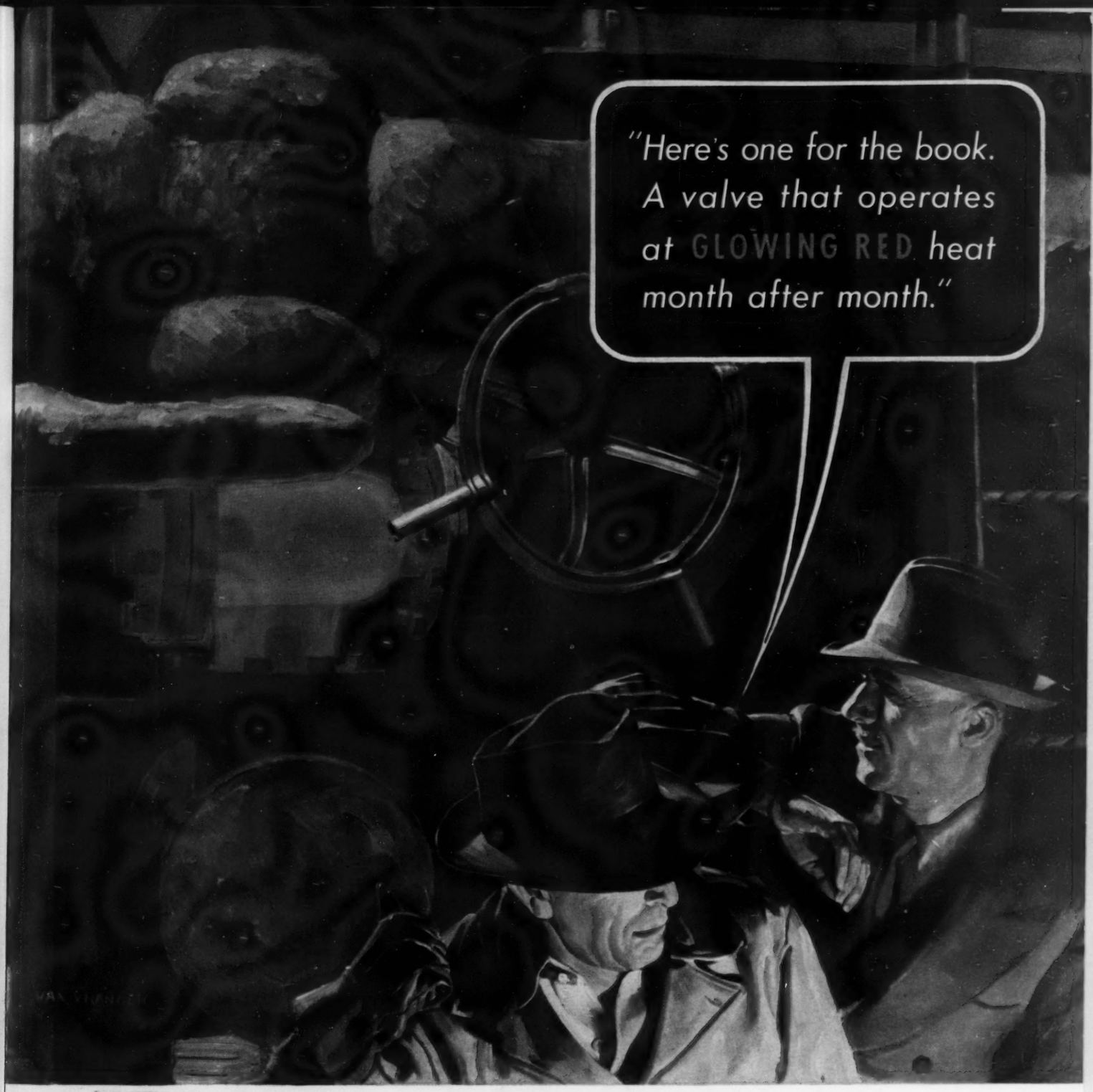
Revenues of manufactured and natural gas utilities amounted to $94,913,400 in February, 1940, as compared with $83,464,900 for the corresponding month of 1939, it has been announced by Paul Ryan, chief statistician for the American Gas Association. This represents an increase of 13.7%.

Of the total revenues, natural gas companies reported $59,677,200 for the month of February, or 17.4% more than for February, 1939. Manufactured gas utility revenues amounted to $35,236,200, or an increase of 8.0% over February, 1939.

■ ■

Kansas City Executive Dies

Charles W. Green, former vice president, general manager and director of the Kansas City (Mo.) Gas Co., died recently at the age of 71. He became vice president and general manager of the company in 1920, serving in this position until his retirement in 1926.



950°

"Stop kidding me! There's no lubricant that will operate in a red-hot valve at 950°," declared the visiting engineer. *But there it is!* In service for many months on a cracking line, in a refinery, this Nordstrom Hypreseal Valve has been making history. In many other refineries, operating topping units, this same type of valve is likewise rendering perfect service at temperatures of 675° F., without a leak; always easy to turn, even if carbon slugs settle in the line. There's no place in which any deposit can lodge. This amazing valve is made of special alloy; the body and plug are Merchromed; (patent pending). The plug is hot lapped at approximately the service temperature. The lubricant is a special compound developed by Nordstrom for this drastic temperature. Just more proof that Nordstrom Valves are truly engineered for the "toughest jobs." Keep upkeep down with Nordstroms.

—naturally it's a **NORDSTROM VALVE**

Introducing MERCHROMED *Valves*

PATENT APPLIED FOR

A PROVEN ENGINEERING ACHIEVEMENT BY NORDSTROM

MERCHROMING

—a highly-technical metal alloy process.
—an impenetrable coating on plug and body.
—specially bonded to friction surfaces.
—gains lowest coefficient of friction.
—invulnerable to corrosion, erosion.
—for temperatures as high as 1000° F.
—prevents galling and scoring.
—applicable to various Nordstroms.

UNRETOUCHED PHOTOS

MERCHROMED PLUG ***in the rough*** **SAME PLUG** ***after machining***

NORDSTROM HYPRESEAL MULTIPORT, SHOWING MERCHROMED BODY

After Merchroming is completed in the body and on plug by special welding, the rough surfaces are ground or machined to final dimension; then the plug is "hot-lapped" into the body. Contacting surfaces have a low-friction, super-finish; intensely hard and perfectly fitted.

Again reflecting the initiative of Nordstrom engineers in offering the most advanced methods of valve manufacturing, *MERCHROMING* is presented. It is a process in which a special welded coating is applied to the rotating, frictional surfaces of the plug and its contacting body. Merchroming provides a coating of extreme hardness, corrosion-resistant, capable of maintaining its properties at temperatures as high as 1000° F. The plugs are "hot-lapped" into the bodies at a temperature corresponding to the service for which they are intended, assuring the most accurate fit and extremely smooth operation. Further details upon request.

While Merchromed Valves may be unnecessary for your services, this new development in valve manufacturing indicates the ability of Nordstrom engineers to provide for every service. Only Nordstrom Valves meet every major valve need.

KEEP UPKEEP DOWN WITH NORDSTROMS

Nordstrom LUBRICATED VALVES

Sealdport Lubrication

MERCO NORDSTROM VALVE COMPANY—*a Subsidiary of* Pittsburgh Equitable Meter Company

WORLD'S LARGEST MANUFACTURERS OF LUBRICATED PLUG VALVES; GASOLINE, OIL & GREASE METERS

Main Offices: 400 Lexington Ave., Pittsburgh, Penna.

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PRODUCTS: Nordstrom Lubricated Valves; Air, Curb and Meter Cocks • Nordstrom Valve Lubricants • EMCO Gas Meters • EMCO-McGaughy Integrators EMCO Regulators • Pittsburgh Meters for Gasoline, Grease, Oil, Water and other Liquids • Raybould Couplings • Stupakoff Bottom Hole Gauges

R. M. Conner, director of the American Gas Association Testing Laboratories, was given a surprise banquet by the Laboratories' employes at the Statler Hotel in Cleveland, in honor of his completion of 15 years of service in organizing and directing the Laboratories.

R. M. Conner Honored Upon Completion of 15 Years As Director of A. G. A. Testing Laboratories

A SURPRISE banquet for Director R. M. Conner was staged by the employes of the American Gas Association Testing Laboratories at the Statler Hotel in Cleveland on May 3, 1940, in honor of his service in organizing and directing the Laboratories for 15 years. Believing he was attending a banquet to celebrate the close of a successful bowling season, Mr. Conner was unaware of the nature of the occasion until it was announced by Toastmaster K. H. Flint, assistant chief testing engineer, following the dinner.

Mr. Conner was presented with a bronze desk set by the Laboratories' staff, including an eight-day clock and barometer mounted on a base with two lifetime pens, desk pad, calendar, ash tray, etc., along with a leather-bound scroll signed by all members of the staff and carrying the inscription:

> "We, the employes of the American Gas Association Testing Laboratories wish to take this means of paying tribute to you who organized and have continuously directed our Laboratories since their inception 15 years ago today. We add our respect and admiration to that of the gas industry generally, for your ability and the outstanding contribution you have made to our industry and to the betterment of the public service it renders."

In order to prevent Mr. Conner from knowing about the plans in advance, only a few outside of the Laboratories' employes were told of the arrangements being made. Walter C. Beckjord, president, and Maj. Alexander Forward, managing director of the A.G.A., unable to be present, sent congratulatory messages. Frank H. Adams, president of the Association of Gas Appliance and Equipment Manufacturers, Kurwin R. Boyes, secretary of the A.G.A., and Eugene D. Milener, secretary of the Industrial Gas Section of the Association, attending the banquet as guests of the Laboratories' staff, complimented Mr. Conner in their addresses on his accomplishments of the last 15 years, as head of the Testing Laboratories.

Mr. Adams in his address stated that not only he, but manufacturers of appliances and equipment generally, had a warm feeling of friendship for Mr. Conner and a high regard for his ability and his accomplishments in organizing and directing the Laboratories. He went on to add that probably the job ahead of the Laboratories during the next 15 years would be more difficult even than during the past 15, and suggested that one of the major problems to be faced is the trend of gas appliance and accessory requirements toward standards of quality and safety.

Mr. Beckjord in his letter to Mr. Conner, which was read at the banquet, stated in part as follows:

> "I wish to offer my own sincere congratulations to Ray Conner upon 15 years' completion of service as Director of the A. G. A. Testing Laboratories in Cleveland. In my opinion he is the one man in the industry who could accomplish what he has, because it has taken not only great technical and chemical knowledge, but a high order of executive ability and great tact, and the ability to coordinate not only the utilities but the manufacturers as well."

In his message to Mr. Conner, Major Forward wrote:

> "Congratulations to Raymond M. Conner upon completion of 15 years' distinguished service as Director of American Gas Association Laboratories. His contribution of technical knowledge and skill, of executive ability and of comprehension of the problems of gas companies and manufacturers have been outstanding and above all he has won and retained the confidence of all elements in the industry in the fairness and impartiality of Laboratories operations."

A note of levity was added to the occasion in a satirical letter from Charles W. Person of the A.G.A. Other messages were received from Harry W. Smith, director Industrial Publicity, and the Pacific Coast Branch Testing Laboratories' staff. Among the speakers representing the various departments of the Laboratories were F. E. Vandaveer, assistant director; F. R. Wright, chief inspector; K. R. Knapp, chief engineer; F. O. Suffron, assistant chief testing engineer; W. R. Teller, chief research engineer; Mrs. Viola Moore, acting head of the stenographic department, and M. E. Ward.

SALES Slants

SALES STRATEGY

WINS BLITZKRIEG OVER OBJECTIONS

HOW do you handle objections? Do you wait until you are confronted by them, and then try to devise some way to get around them? Or do you look ahead and plan a line of strategy which will insure a sales victory? If you want to win a real blitzkrieg, the planned line of attack is the only one that will bring sure results. You must approach the problem as the commander-in-chief of an army approaches it: foreseeing the obstacles and difficulties you are going to meet, and providing means to overcome them.

Old Nathan Bedford Forrest, able but unschooled confederate general, had one rule for winning battles: "Git thar fustus with the mostus!" Anticipating from past experience and his own good common sense what his foe was going to do, he always managed to arrive at an advantageous spot just a little ahead of his enemy. A long list of victories attests the worth of his simple strategy.

And it is a method of attack that can be adapted to salesmanship, too. The smart salesman knows from experience that certain objections are sure to arise sooner or later in the course of his presentation. So he "gits thar fustus with the mostus" by bringing up those objections and answering them before the prospect has a chance to.

"Now you are probably thinking, Mrs. Jones," he might say, as an illustration, "that this appliance is going to cost you a lot more to operate. But our experience shows the opposite to be true. Look at these figures."

An objection disposed of that way is not going to rise up later on to defeat you.

General Grant, when he couldn't defeat General Robert E. Lee by frontal assault in the summer-long campaign which brought the Civil War to an end, kept sliding around him and forcing him to take up new positions until he was trapped in Richmond, Virginia.

The same sort of strategy might be applied in handling the prospect who thinks what you have to offer is all

right, but thinks she would prefer your competitor's merchandise. Having failed to convince her by direct demonstration, you may slide around this objection by finding out exactly what she has in mind, and then proving to her that what you have fills the bill. If you can get her to admit that your merchandise meets your competitor's in every essential detail, you are on your way to a sale.

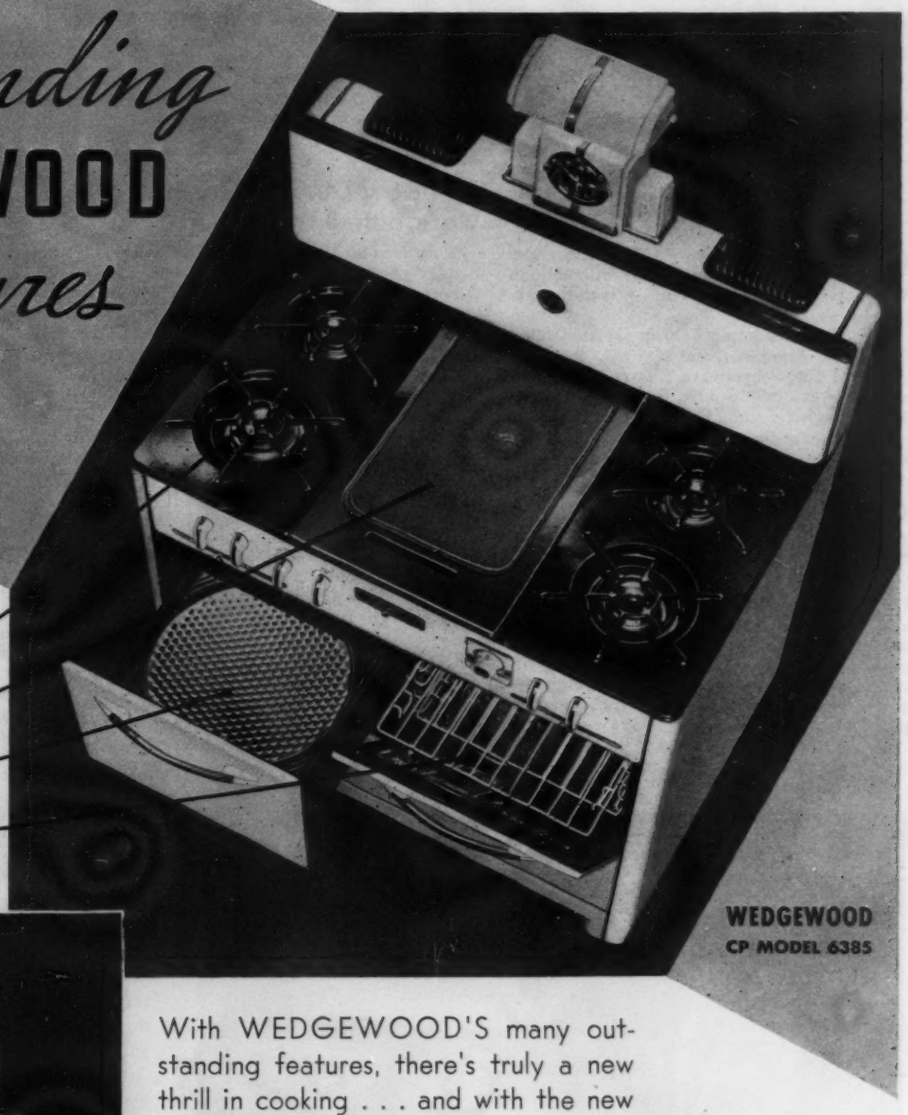
It is now pretty well established that the recent invasion of Norway by German forces was for the purpose of diverting attention from their real point of attack. They hoped, evidently, to draw Allied forces into this area in large numbers, and thus weaken the front upon which they proposed to launch their main attack. Recognition of the feint probably saved the Allies from much worse reverses than they are now suffering.

And recognition of objections which can safely be ignored will similarly save a salesman from sales set backs. The price objection is a case in point. This objection, as every one who has studied salesmanship knows, is not a valid one. But it is one that is difficult to ignore. Once you are drawn in to a discussion of it, your sale is almost sure to be lost. On the other hand, properly handled, you can often turn this objection to account by using it to demonstrate how the prospect cannot afford to not have your product.

Not infrequently a clever general has turned probable defeat into certain victory by capitalizing on his weaknesses. Napoleon, for instance, in his earlier campaigns realized his great weakness in point of numbers. Taking advantage of the speed that a small, mobile army has, he marched swiftly to meet segments of his foe's forces and defeated them before they could form a common front against his inferior numbers.

Many a product has been sold in somewhat the same way by capitalizing on what at first sight might be objected to as disadvantages. An extreme example of this is in the electric range where the undesirable afterglow of the element when it is turned off is sold as "stored heat." It is obvious no energy is actually "stored" to produce this condition, yet clever salesmanship has turned this into an actual advantage of that type of appliance.

Outstanding WEDGEWOOD (CP) *Features*



- DIVIDED TOP • SPEED-PLUS-SIMMER BURNERS
- TOP GRIDDLE
- ASTOGRIL BROILER
- LOW TEMPERATURE OVEN

WEDGEWOOD
CP MODEL 6385

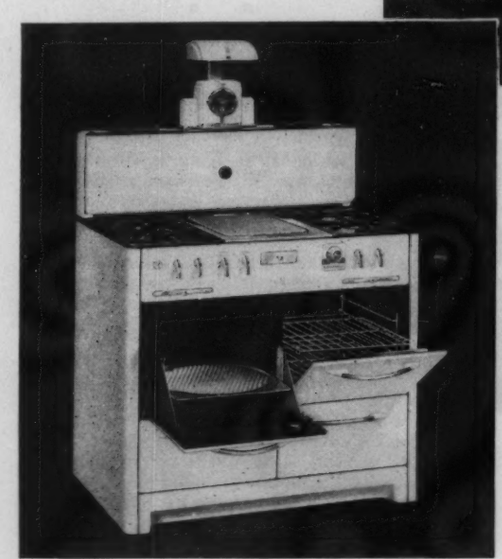


Illustration above shows
WEDGEWOOD CP Model 6385

With WEDGEWOOD'S many outstanding features, there's truly a new thrill in cooking . . . and with the new WEDGEWOOD 6000 series you have a complete and wide selection of pleasing combinations to fill every possible wish and need.

Model 6385—Four burner, divided top range, high broiler with griddle.

Model 6285—Four burner, divided top range with built-in gas heater, low broiler, with griddle.

Model 6185—Four burner, top range, low broiler with griddle.

Gas THE MODERN FUEL

WEDGEWOOD RANGES ARE FACTORY BUILT FOR ALL TYPES OF GAS.

WEDGEWOOD THE MODERN GAS RANGE

JAMES GRAHAM MANUFACTURING CO. • Los Angeles - San Francisco - Newark, California - Portland, Oregon

Industry's Fair Exhibit Sponsored By P. G. & E. Co.

AN entirely new exhibit of gas appliances is being shown in the Electrical Building at the Golden Gate International Exposition in 1940. The exhibit, sponsored by the Pacific Gas & Electric Co., embraces 1700 sq. ft. of space, and includes three model kitchens, one of which will be a demonstration kitchen for gas and electric power. Among the exhibitors showing are James Graham Manufacturing Co., Occidental Stove Co., Hammer-Bray Co., Hoyt Water Heater Co., and Servel, Inc.

In the House and Gardens Building, an all-glass house will contain exhibits under the direction of Edna Kirby, which will include Wedgewood gas ranges and Electrolux refrigerators.

At a dinner meeting held in the Bohemian Club, San Francisco, on May 27, the final report of the Cooperative Gas Exhibit Committee for the 1939 Golden Gate International Exposition was made. R. E. Fisher, chairman of the Committee, acted as host and submitted the report of last year's activities.

■ ■

Gas Service Co.'s Cooking School Attended By 1700

Crowds ranging up to 1700 packed Armory Hall in Pawhuska, Okla., April 30, May 1 and 2, attending the *Daily Capital-Journal* and Gas Service Co. second annual school of cookery and home exposition. Seventeen merchandising firms, three automobile companies and a group of national advertisers participated with exhibits.

The school of cookery was in charge of Adelle Morganson, director of the home service department, Gas Service Co., for the Oklahoma district. She demonstrated each afternoon and conducted a cake-baking contest in which 34 cakes were entered and first, second, third and fourth prizes were awarded. Modern gas CP ranges were used in the demonstrations. At the close of the exposition the Gas Service Co. awarded a Magic Chef gas range to the first prize winner. Entertainment, including vaudeville and revues, were staged each evening.

■ ■

Window Display Contest Conducted By A.G.A.

Entries in the refrigeration and water heater display contest now being sponsored by the American Gas Association must be mailed to Association headquarters before June 15, it was announced in the spring issue of *A.G.A. Display Bulletin* by H. V. Potter, chairman of displays. Winners of the contest will be announced in the next *Bulletin*.

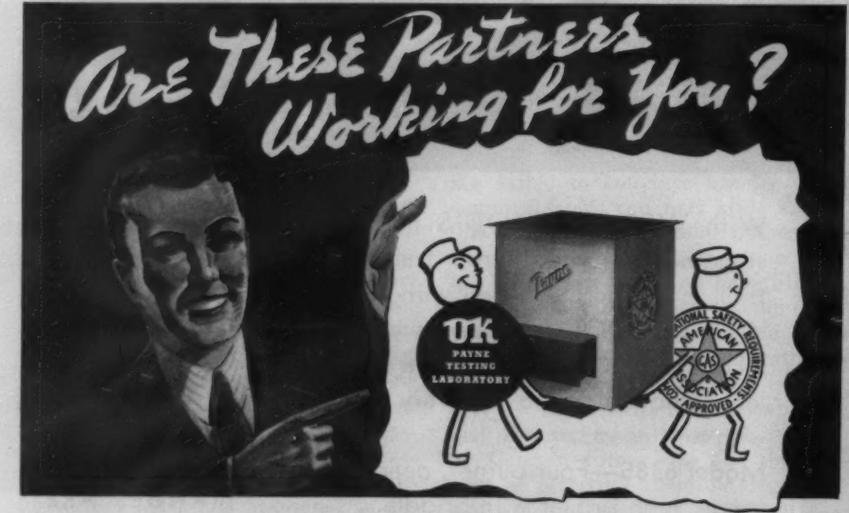
Photographs of the displays, which can be either window or store displays made up after May 1, 1939, will be judged by McCann-Erickson, Inc., advertising agency of New York City. First prizes for the best water heater and refrigeration displays will be $15 each; second prizes, $10 each.

Pictures may be addressed to J. W. West, Jr., at A.G.A. headquarters, or H. Vinton Potter, Oklahoma Natural Gas Co., Tulsa.

■ ■

General Controls Expands

Announcement is made by General Controls Co., manufacturers of pressure, temperature and flow controls, of the opening of a branch office at 687 Boylston Street, Boston. C. W. Marsh, sales engineer, will be in charge.



Here are two powerful salesmen, who work *as partners* ONLY for the PAYNE Dealer. Prominently displayed on every furnace, together they signify that all PAYNE Furnaces have met the Industry's *top* requirements for design, safety and performance. ☆ A.G.A. approved—of course. But even "Blue Star" standards are exceeded in our own "proving grounds", the *Payne Testing Laboratory*. Here, PAYNE technicians, whose one goal is *perfection*, relentlessly test and retest innovations constantly developed by PAYNE'S famous engineering staff. Dealers . . . sales-minded Utility Men . . . sell dependable PAYNE Furnaces, and these partners will help you close every deal—as well as protect your reputation *after the sale is made.*

Floor Furnaces—Forced Air Units—Duplex Furnaces—Gravity Furnaces—Console Heaters . . . a PAYNE gas appliance for every heating need.
☆ Utility Men—a few territories still open. Write us.

PAYNEHEAT *Payne* **FURNACE & SUPPLY CO., INC.**
BEVERLY HILLS • CALIFORNIA

SALES CAMPAIGNS

Company: Hales-Mullaly, Inc., Oklahoma City, Okla.

Campaign Title: 1940 Gold Rush Contest.

Description: With about two more months to go in this contest, Hales-Mullaly, Inc. is planning to send approximately 140 prize-winning Electrolux salesmen and dealers on free trips to the Grand Canyon, Los Angeles, Yosemite, San Francisco, and Salt Lake City.

The free trip will be awarded to each employe-salesman and proprietor-salesman who makes 90% of his yearly quota in sales for the seven months period from January 1 to July 31, 1940. Extra trips will be awarded for each 25 refrigerators sold over contest quota, enabling quota winners to designate other persons to take the trip.

Harry C. Canup, Hales-Mullaly sales manager, announces tentative dates for the West Coast trip as leaving Oklahoma City on August 16 and returning there August 28.

■ ■

Company: Chattanooga Gas Co., Chattanooga, Tenn.

Campaign Theme: Salesmen on warpath.

Description: Salesmen in this contest which has recently ended were divided into two tribes competing for "sales scalps." For each appliance sold, "scalp bounties," consisting of a fixed amount for each type of appliance, were divided into three equal parts and placed in a pouch, bowl, and pot. The amount in the pouch was distributed daily to the leading tribe. Twice a month the leading tribe shared in the profits in the bowl, and the proceeds in the pot went to the winning tribe at the close of the contest, on the condition that if the total quota was not met, the company would recover the money. This contest was developed by C. N. Mallory, merchandise manager.

■ ■

Company: Florida Public Service Co., Orlando, Fla.

Campaign Theme: CP Presidential Election.

Description: This contest, recently finished, was a drive for CP range sales, with the leading salesman emerging as CP President for 1940. Campaign votes were credited each salesman with every gas range sold, a double quantity of 5000 being awarded for each CP range. Additional bonus votes were given for cash sales, and deductions from the regular schedule were made in other instances. The contest was originated by H. Stuart Johnson, gas sales supervisor.

■ ■

Company: Gas Appliance Society of California.

Campaign Theme: "Why wait? Be up to date!" with a 1940 gas water heater.

Description: Special trade-in allowances are being made in this campaign, which will end June 30. Cooperative advertisements and consumer articles are appearing in the newspapers, and attractive campaign blotters have been made available to dealers.

■ ■

Company: Consolidated Gas Utilities Corp., Blackwell, Okla.

Campaign Theme: Home comfort.

Description: The company, which itself does not handle gas appliances, is cooperating with dealers in selling new appliances, with the objective in view of extending better and more efficient gas service to its customers. Data from the engineering department is being made available to customers.

HAVE YOU AN *Eye for the Future?*

CRYSTAL GAZING isn't needed to reveal the policies that alert utility management should pursue today to assure the brightest possible future for their companies.

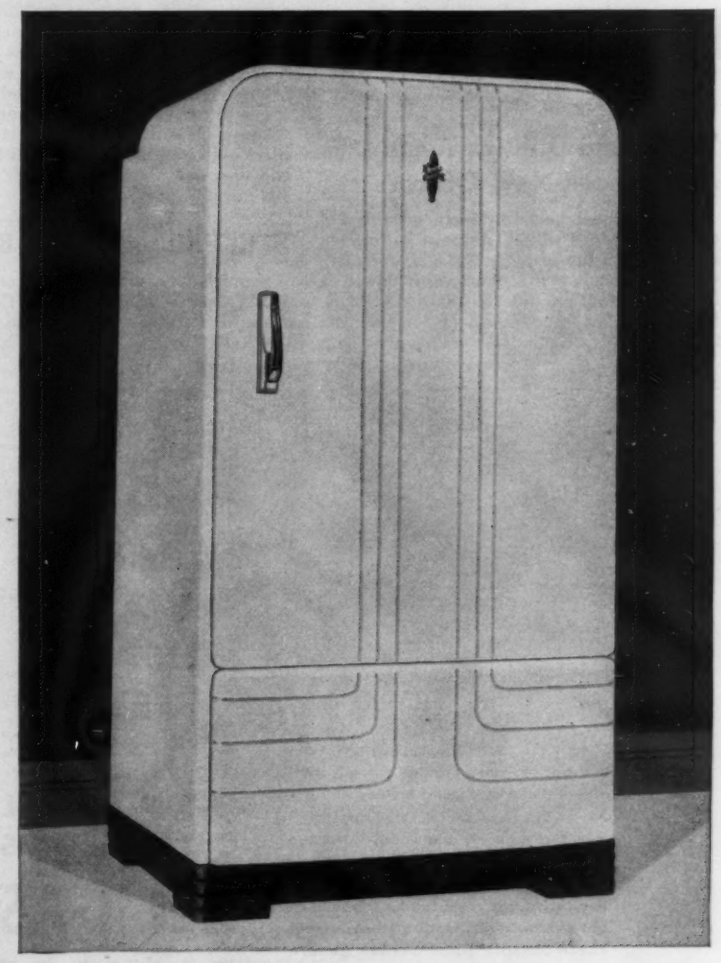
What *is* required is the realistic acceptance of a few simple and fairly obvious facts. One of the most important of these is that, in the coming twelve months, an estimated million or more people are going to be replacing their worn out, noisy, expensive automatic refrigerators.

This represents an unusual opportunity for the gas industry in more ways than one.

Leading utilities are capitalizing on the permanent silence, continued low operating cost and extra years of dependable service which only Gas Refrigeration can offer. They are thus reaping worthwhile merchandising profits, and gaining immediate load increases without increased investment.

More important, however, is the protection they're providing for their present load . . . plus the strides they're making toward the stimulation of other gas appliance sales and the promotion of "Gas for All Four Jobs."

Have *you* an eye for the future?



The SERVEL ELECTROLUX Gas Refrigerator

GAS REFRIGERATION—

- ★ PROTECTS YOUR PRESENT LOAD
- ★ INCREASES LOAD WITHOUT INCREASED INVESTMENT
- ★ STIMULATES THE SALE OF OTHER GAS APPLIANCES
- ★ PUBLICIZES THE MODERNITY OF GAS
- ★ PROMOTES THE USE OF "GAS FOR ALL FOUR JOBS"

WINS GOOD WILL FOR GAS AND GAS SERVICE

Gas Appliances Improve After Laboratory Research

MORE improvements in gas-burning appliances have been achieved in the last 10 years than in all the 40 years previous, according to testimony before the Temporary National Economic Committee in Washington by Dr. P. G. Agnew, of New York, secretary of the American Standards Association.

"This advance has resulted from a great deal of research and testing work which was headed up in the gas industry itself," Dr. Agnew said. "In that 10-year period the thermal efficiency of the top burners of the gas range has increased by 50%. That means that today in the modern gas range one can heat three quarts of water with the same amount of gas that 10 years ago was required to heat two quarts. Similarly, the efficiency of the gas-fired water heater has increased 25% in that same 10-year period."

The American Gas Association requirements for domestic gas-burning appliances, tested in the Association Laboratories in Cleveland and Los Angeles, have been adopted by the American Standards Association as American Standards.

■ ■

Wisconsin Utilities Assn. Announces New Officers

In the annual ballot by mail, members of the Wisconsin Utilities Association elected as next year's president A. P. Gale, executive vice president of the Wisconsin Power & Light Co., Madison. Mr. Gale succeeds Bruno Rahn, who has been president for the past two years. Mr. Rahn, as retiring president, becomes chairman of the advisory committee of the Association.

Succeeding Mr. Gale as vice president is Ralph E. Moody, executive vice president of the Wisconsin Gas & Electric Co., Racine. Louis T. Smith, secretary and treasurer of the Milwaukee Gas Light Co., was elected treasurer to succeed John Dockendorf.

The new officers took office with the beginning of the Association's fiscal year May 1.

■ ■

Pennsylvania Association Holds Annual Meeting

The 32nd annual meeting of the Pennsylvania Gas Association was held May 14, 15, 16 at Skytop Club, Skytop, Pa. The following officers were elected for next year at the final meeting: president, M. A. Boylan, Scranton; first vice president, P. T. Dashiell, Philadelphia; second vice president, F. W. Lesley, York; third vice president, H. H. Ganser, Norristown; secretary, Wm. Naile, Lebanon; treasurer, W. G. Sterrett, Jenkintown.

The program Wednesday consisted of the distribution meeting with H. N. Squier presiding, the accounting meeting with James A. Schultz presiding, and the production meeting with H. S. Bair presiding. Thursday, "Customer and Employe Relations," with Blackwell Newhall presiding, was discussed, and also new business, with F. H. Trembly, Jr., presiding.

■ ■

S. K. Philips Dies In Boston

Samuel Kniess Philips, secretary-treasurer and a trustee of the Eastern Gas and Fuel Associates, Boston, Mass., died April 13 at the age of 44.

Gas Engineers Frank P. Fisher and Herbert R. Davis.

Saskatoon To Have Natural Gas By Next November

CONSTRUCTION of a natural gas distribution system in Saskatoon, Saskatchewan, Canada, was started the latter part of May by the Northern Natural Gas Co., Ltd., of Saskatoon, it has been reported by J. K. Swanson, general manager. The natural gas will be brought to Saskatoon from Lloydminster through a 162-mile pipe line to be completed by November 1. According to Mr. Swanson and Walter F. Thorn of Franco Oils, Ltd., construction of the line will start about July 15.

The line will be laid as closely as possible to natural gas reserves along the route to Saskatoon. According to present plans for natural gas and oil drilling, one well will be brought into production every 10 days. A seismographic survey of the area between Lloydminster and the Unity-Vera natural gas and oil field is being made by a seismograph company to determine location of new wells.

One of the new gas wells already producing is the Colony No. 1, which is considered the largest natural gas well in the British Empire. Frank P. Fisher and Herbert R. Davis, gas engineers, have been placed in charge of the construction of the pipe line and the city gas mains.

Plans for the distribution system and pipe line were made public after the citizens of Saskatoon voted on April 3 to grant a natural gas franchise to the Northern Natural Co.

■ ■

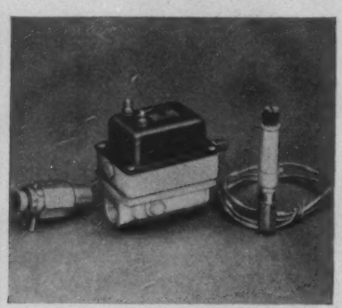
Gas Distributing Companies Listed By A.G.A.E.M.

A list of all gas distributing companies operating in the United States as of January 1, 1939, has recently been compiled by the A.G.A.E.M. The companies are classified by states, and the list includes information on the companies supplying gas service, their principal offices, the number of customers served by each, the kind of gas supplied and the heating value of the fuel. The total number of gas companies operating in each of the states, together with their total number of customers, is also given.

■ ■

E. G. Kent, Executive, Dies

Edward Gruet Kent, of Madison, N. J., former executive with the Public Service Electric & Gas Co., Newark, died recently, having served the company for 41 years. Mr. Kent, who retired last September, served for a number of years as manager of the Summit, N. J., office before going to the Newark office two years ago.



BX SERIES WATER HEATER SET

Specify this BX-250 water heater set and you get real temperature control. Small differentials, averaging between 6° and 10° in the Tank Thermostat insure maximum fuel economy and steady water supply at the desired temperature, with no water lag or overheating. Sensitive, positive action gas valve can be supplied for natural, manufactured or butane gas. Thermocouple pilot burner generator provides adequate current to operate the valve and eliminates all outside sources of electricity. Valves are available in ⅜" and ½" I.P.S. Tank Thermostat is extremely compact and is usually installed so that only the setting knob projects beyond the casing of the water heater. Temperature range is between 60° and 170° F.

GENERAL CONTROLS

ALL-GAS PACKAGE

Send for New 1940 Catalog describing General Controls For Every Service

GENERAL CONTROLS

450 East Ohio Street
Chicago, Ill.

267 5th Avenue
New York City

10 YEARS OLD... THIS DURABLE VENT PIPE LOOKS GOOD FOR YEARS TO COME!

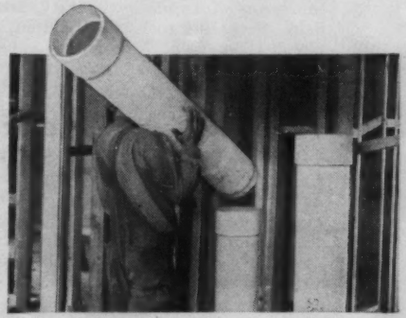
Long, dependable service features installation of J-M Transite Flue Pipe on this domestic gas-heating system . . .

SINCE 1930, this installation of J-M Transite Flue Pipe has been in steady service—constantly exposed to weather on the outside and corrosive fumes on the inside. Yet today, the venting system is in excellent condition . . . shows no signs of needing repairs or replacements.

That's the type of dependable service that home owners appreciate!

And J-M Transite Flue Pipe provides many other advantages in addition to long life. Made of asbestos and cement, it is 100% fireproof, cannot rot, rust or decay and effectively resists corrosion. Its unusual durability minimizes callbacks for servicing . . . keeps customers sold.

Furthermore, Transite's light weight, easy handling and complete line of fittings make installation simple, rapid and economical. For full details, write for Brochure TR-13A. Johns-Manville, 22 East 40th Street, New York, N. Y.



Fast Installation **is made with J-M Transite Flue Pipe because it is light in weight, easy to handle. And it is supplied in a complete range of sizes and fittings that speed up work, even in restricted working quarters.**

After Ten Years' **exposure to weather and corrosive fumes, this J-M Transite Flue Pipe installation is still in excellent condition . . . needs no maintenance. Permanent, economical venting systems like this back up your promises of dependable service from gas-heating systems.**

(unretouched photograph)

Johns-Manville

TRANSITE FLUE PIPE

Transmission Corp. Plans 800-Mile Line From Louisiana to Tennessee Markets

THE Tennessee Gas & Transmission Corp., Chattanooga, plans to spend from $15,000,000 to $18,000,000 to bring natural gas from the Louisiana fields to supply Chattanooga, Nashville, Knoxville and 31 other Tennessee cities and towns, it was announced by Curtis B. Dall, New York investment banker, if the plans meet with the approval of the Securities Exchange Commission and the Tennessee Railroad and Public Utilities Commission. Mr. Dall is associated with New York and Tennessee interests in the organization of the gas corporation which has launched plans to build the 800-mile pipeline from Louisiana fields to Tennessee. The line would enter Tennessee in the vicinity of Savannah, run south of Nashville and north of Chattanooga to Knoxville, it was announced.

The Chattanooga Gas Co. has also applied to the Tennessee Utilities Commission for a rate schedule on gas which would be piped to the city by the Southern Gas Co., of which it is an affiliate, by way of Calhoun, Ga.

At a hearing before the State Utilities Commission the Tennessee Gas Corp. opposed the application of the Chattanooga Gas Co. for a rate schedule on the grounds that the Chattanooga company's natural gas supply was inadequate to meet the city's needs and that the proposed rates were higher in comparison to those charged in other Tennessee cities. The Utilities Commission granted a delay in the final decision until a later date when the Tennessee Gas & Transmission Co. would present its case before the commission.

Plans for the incorporation of the new company call for the utilization of distribution systems now being used by gas companies in Nashville, Chattanooga and Knoxville, either by acquisition by the new corporation or supplying these companies with natural gas at wholesale prices. It was pointed out that gas rates for domestic consumers and for commercial consumers would be "materially" reduced in some instances perhaps as much as 50%. In the event the corporation's plans move along smoothly, it was announced that natural gas would be available in Tennessee by next winter.

■ ■

Worthington, Ind., to Be Served With Natural Gas

A franchise for natural gas to be furnished to the residents and industries of Worthington, Ind., has been granted to the Indiana Consolidated Oil & Gas Co. The gas is expected to be furnished from a gas well two miles south of Lyons, Greene County, Ind., and will serve, in addition to Worthington, the towns of Lyons, Switz City, and Bloomfield. According to C. C. Hendren, an attorney of Bloomfield, the company expects to be a producing as well as transmitting company.

■ ■

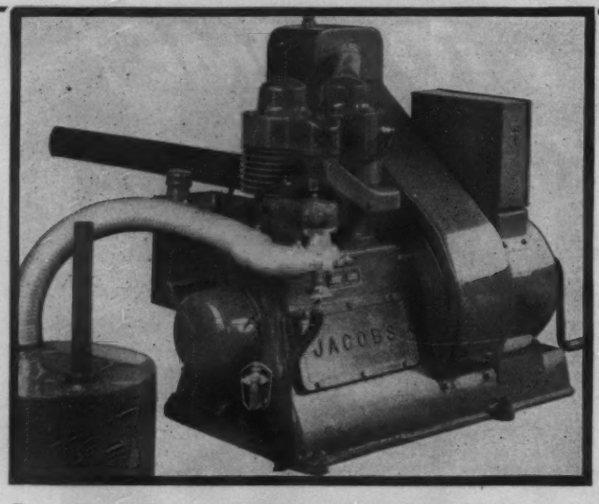
Florence Lavigne Injured

Mrs. Florence Lavigne, of San Francisco, Calif., secretary to Clifford Johnstone, managing director of the Pacific Coast Gas Association, was seriously injured by being struck by an automobile on May 18, in San Francisco. Her injuries will probably confine her to the hospital for three months.

■ ■

Assistant Sec'y of FPC Dies

Jesse B. Williamson, assistant secretary of the Federal Power Commission, died May 1 from a heart attack. Mr. Williamson had held the secretarial position since September, 1938.



For Maximum Protection at Minimum Operating and Maintenance Costs

JACOBS SPECIAL CATHODIC UNIT

Simplicity of design and ruggedness of construction characterize JACOBS Special Cathodic Unit. Slow speed. Few moving parts—no valves, gears, belts or pumps to wear out or break down. Positive lubrication and engine temperature control. Designed exclusively for cathodic protection of pipelines. 2 years in development. Not an assembled plant—manufactured complete in our own factory. Lowest operating and maintenance costs on record. Operates on gas, butane or gasoline.

UNCONDITIONALLY GUARANTEED FOR 1 YEAR!

Write at once for complete details!

THE JACOBS WIND ELECTRIC CO., INC.
PIPELINE DIVISION MINNEAPOLIS, MINN.

Isn't this a BETTER WAY to control Gas Heaters?

With Klixon Gas Valves you have no solenoid troubles—no sticking, no humming, no chattering. For Klixon Valves are completely thermal. A snap-acting thermostatic disc is the only operating element. Klixon Room Thermostats are also disc-operated. They contain no magnets, bellows or toggles. They are simple, sensitive, vibration-proof and non-radio-interfering.
Switch to Klixon Gas Controls. A complete line of valve sizes are available. Also many attractive thermostat finishes. Write.

KLIXON

Spencer Thermostat Co.
806 Forest Street
ATTLEBORO, MASS., U. S. A.

Get in on the Ground Floor

Yes, sir, with a floor furnace you can *get in on the ground floor* in hundreds of homes where you are not at present giving the space heating service or enjoying the profit that should be yours.

Homes that can't afford or aren't big enough for basement plants. Homes that have no basements or which present installation problems that have kept other *permanent* equipment out.

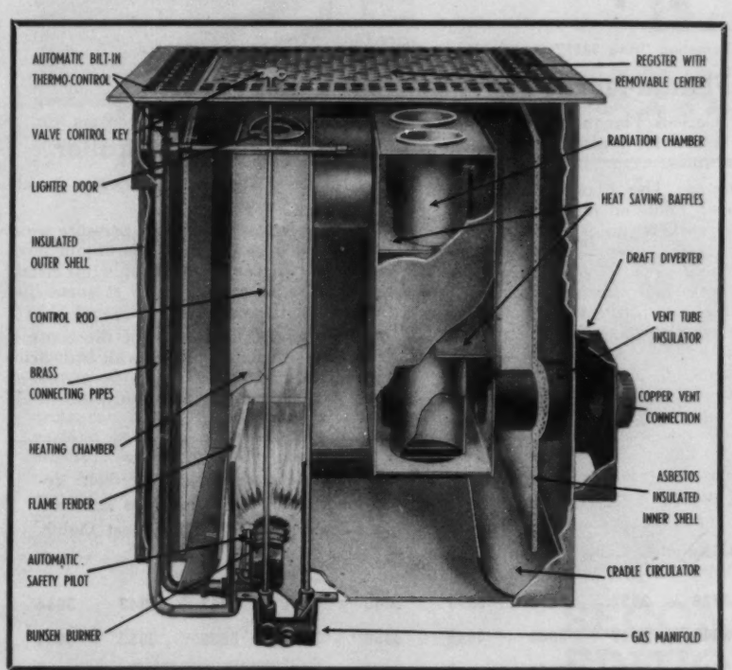
A good floor furnace will get you in... and keep you in *permanently*... because it becomes a *permanent* part of the house.

This is the most practical means of putting space heating service with gas into thousands of existing homes... and more and more alert utility executives are realizing that.

We're talking for good floor furnaces generally... but particularly for WARDS... because 31 years of building and selling them have proved what they can do for you.

As one dealer wrote us on May 11, 1940..."After a year's operation in this territory with Ward Floor Furnaces versus ordinary space heaters and other types of heating equipment, we find that your floor furnaces are without question the best type of heating that can possibly be put into a home. We expect to try to sell a Ward on every job we install this coming year."

So why not take the first step now. Ask for a copy of our latest catalog. Find out how your company can *get in on the ground floor* with WARD Floor Furnaces.



Laura Clarkson

SECRETARY-TREASURER

31 YEARS... 62 MODELS

For 31 years WARD FLOOR FURNACES have grown in importance in the merchandising programs of many utilities. Today we make floor furnaces *exclusively*... 62 models adaptable to a wide variety of heating requirements. WARD FLOOR FURNACES are *ten-year-guaranteed* appliances with a proven record of service. They will please your customers... and profit your company.

WARD HEATER COMPANY... LOS ANGELES

FACTORY REPRESENTATIVES

A. S. KINCAID, *Southern Manager*, P.O. Box 5, Dallas, Texas... J. H. STUBBINS, 300 East 68th Terrace, Kansas City, Missouri... H. C. SANDERSON, 207 Fulton Building, Pittsburgh, Pennsylvania... L. E. KIRKPATRICK, 1700 15th Street, Denver, Colorado... LEON M. TAYLOR, 3200 Main Street, Dallas, Texas

Get in on the Ground Floor with

WARD

Floor Furnaces

YOUR LOAD IS AS GOOD AS THE APPLIANCE YOU SELL

OIL & GAS *Equipment Review*

Reg. U. S. Pat. Off.

• **THE READER'S ATTENTION is called to the coupon in the lower right hand corner of this page. This coupon is printed for the reader's convenience and will enable him to obtain with minimum effort further information on any of the items or catalogs listed in this department. All he has to do is to "ring" on the coupon the number that corresponds to the number printed over the item in which he is interested, clip out the coupon, and mail it to GAS, 1709 West Eighth Street, Los Angeles, Calif.—Editor.**

For more information **"ring 3835"** on coupon

Grease Gun

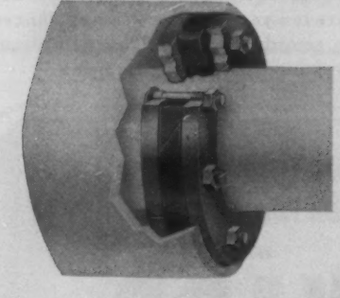
Trade Name: Pressurelube Grease Gun.

Application: Proper lubrication for all oil field equipment, including portable pulling units, drilling units, trucks, tractors, etc.

Features Claimed: Saves time, wear, and cost. No need to take a piece of equipment out of service for greasing since no air hose or electric cord is required. Correct pressure available for applying the lightest or heaviest grease in either the hottest or the coldest weather. Eliminates the frequent trouble with frozen or clogged grease channels that is the principal cause for failures due to improper lubrication. Easy-running ball bearing wheels with pneumatic tires. All-metal high-pressure control handle—no washers or other weak points to cause leakage and wastage under highest pressure. Entirely portable — operates anywhere.—*Fruehauf Trailer Co., 2160 E. 25th St., Los Angeles, Calif.*

■ ■

For more information **"ring 3836"** on coupon



Casing Bushing

Trade Name: Dresser Style 83 Casing Bushing.

Application: Used for sealing the ends of a protective casing through which a pipe line runs.

Features Claimed: The bushing will seal out dirt, debris, weeds, small animals, and corrosive water from inside of casing. It "floats" pipe line in casing — vibration and shock from passing trains and traffic are absorbed by the resilient rubber gasket. It centers pipe line in casing — pipe does not rest on bottom of casing where corrosion may develop and coating be scraped off. Can be quickly and easily installed by one man using only a wrench. The Style 83 Casing Bushing is offered by the company in four types to meet varying field conditions. Types 1 and 2 take care of all ordinary installations where there is no pressure condition between pipe and casing. Types 3 and 4 are designed for installations where such internal pressures may occur, or where line is subject to heavy ground settlement or to strong currents or undertows. Any size can be furnished.

Description: The casing bushing consists of two halved steel rings with a rubber-compound gasket bolted between them. As the bolts are tightened, gasket expands outwardly against inside of casing and inwardly against outside of pipe, making a tight seal against both. Casing Bushings are recommended for any line where protective casing is used, as under a railroad track, highway, embankment; or across a swamp, canal, irrigation ditch, or stream.—*Dresser Manufacturing Co., Bradford, Pa.*

■ ■

For more information **"ring 3837"** on coupon

Flange-Jacks

Trade Name: Garlock Flange-Jacks.

Application: A tool for replacing gaskets in flanged pipe lines.

Features Claimed: The Flange-Jack is designed to open joints on pipe lines for the renewal of gaskets quickly and easily. Flange faces will not be damaged, nor will there be sparks caused by hammer blows on chisels or wedges, and no resulting vibration in the pipe line. As the jackscrews are tightened, the flanges are separated gradually and evenly. After the new gasket has been applied, the joint is closed as easily as it was opened. Bolt holes are in alignment and the gasket is properly positioned.—*The Garlock Packing Co., Palmyra, New York.*

■ ■

For more information **"ring 3838"** on coupon

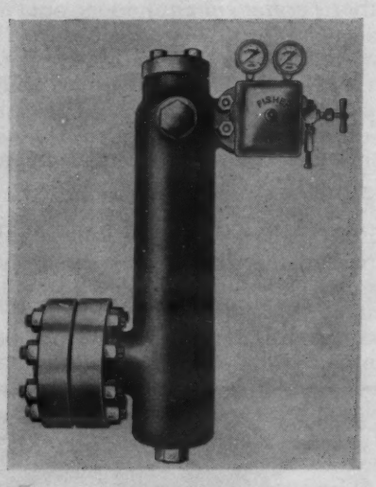
Air Compressor

Trade Name: Smith Air Compressor.

Description: The capacity of this compressor is sufficient to operate rock drills, paving breakers, tampers, sand blasts, rivet hammers, busters, spaces, picks, carving tools, metallizing guns, paint guns, etc. Operating cost and maintenance is low. Being light weight, the unit is easy to handle and to move from one job to another. The capacity may be varied for different jobs. It is equipped with a self-starter. There are no coupling belts, clutch or gears.—*Gordon Smith & Co., 510 College St., Bowling Green, Ky.*

■ ■

For more information **"ring 3839"** on coupon



Liquid Level Controller

Trade Name: Fisher High Pressure Level-Trol.

Application: Designed for high pressure wide range service as a remote type liquid level controller where it is desirable to install the diaphragm control valve at some distance from the vessel.

Features Claimed: A feature of the controller is smooth control action with little friction lag, high sensitivity, wide range of control and throttling range adjustment 20

This coupon will bring you further information, catalogs, etc., concerning products described in the Oil & Gas Equipment Review Department of GAS. "Ring" the numbers of items which interest you, sign and mail this coupon to **GAS, 1709 West Eighth Street, Los Angeles, Calif.**

3835	3836	3837	3838	3839	3840	3841	3842	3843	3844
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3855	3856	3857	3858	3859	3860				June, 1940

Name.....**Position**.....

Company.....

Address.....

City.....**State**.....

to 200%. The body is electric cast steel, suitable for maximum cold working pressures of 4000 lbs. The 3-in. by 18-in. Dow metal float is supported by a chrome vanadium tungsten steel cantilever spring. Bearing is non-lubricating packless type. Connection for assembly on the bottom of the cage member is high pressure hydraulic type. The complete unit includes a ¼-in. Fisher Type 77 auxiliary operating pressure regulator, two operating medium pressure gages and cooling fin assembly.—*Fisher Governor Co., Marshalltown, Iowa.*

■ ■

For more information **"ring 3840"** on coupon

Power Compressor

Trade Name: Schramm Fordair Power Take-off Compressor.

Description: The compressor unit is an eight-cylinder "V" block with special cylinder heads, camshaft, and manifolds. It will operate on any standard truck that can be provided with a split shaft power take-off. The overhead tank mounting is a new and practical method of conserving space. The cooling system is so designed that a cab can be built around the unit without impairing the operation. This compressor is built in larger sizes and for all makes of trucks.—*Schramm, Inc., West Chester, Pa.*

■ ■

For more information **"ring 3841"** on coupon

Gage Poles

Trade Name: Aluminum Gage Poles.

Application: A pole used for gaging oil and gas (butane and propane) tanks.

Features Claimed: With this aluminum gage pole, the gallons per inch for any specified size tank can easily be determined. Tables have been compiled for every size horizontal tank, and are included with the gage. These gages may be had in metal or wood, and special poles will be made from any material and type of graduations that customer may specify.—*Chicago Gage Pole Co., 209 W. Jackson Blvd., Chicago, Ill.*

■ ■

For more information **"ring 3842"** on coupon

Oil Field Light Plants

Trade Name: Novo Generator.

Description: A specially designed oil field generating set, easily portable, and with sturdy steel skids with end loops. They can also be furnished on trucks. Power units can be equipped with combination gas and gasoline carburetor. Outfit is completely weather proof with cover over the new super safe switchboard. These generators are built in fifteen different sizes powered with air- or water-cooled gas and gasoline engines or by Diesel units.—*Novo Engine Co., Lansing, Mich.*

■ ■

For more information **"ring 3843"** on coupon

Indicator

Trade Name: Davis Indicator.

Application: Used to detect the development of a hazardous condition in a tank which has been gas freed. Also used in pits to detect an accumulation of gas.

Description: The indicator is placed in a gas-free area where the needle of the meter may be watched to note an increase in reading toward the lower explosive limit. The indicator head is attached to a 30-ft. cable and placed in the tank back of where cutting is being carried on or on the inside of tank toward sun or in the well hole. This indicator head is equipped with blowers through which the gas or vapor air mixture will diffuse and, passing through the three layers of miners' gauze which act as a flame arrestor, reach the active filament. Thus, it acts automatically to register the increase in gas or vapor air concentration without the necessity of drawing sample by means of aspirator bulb or pump.—*Davis Emergency Equipment Co., Inc., 55 Van Dam St., New York City.*

■ ■

For more information **"ring 3844"** on coupon

Wick Feed Oiler

Trade Name: Trico Unbreakable Wick Feed Oiler.

Application: The oiler is intended for use on machinery which operates intermittently.

Features Claimed: A lever at the top of the oiler when in a vertical position starts the feed and when flipped to the side shuts off the feed. No flooding of oil when the machine is idle. The oil supply is always visible and the unbreakable reservoir tells when refilling is necessary. When oiler is filled above the point where the wick enters the center tube, the surplus oil drains into the bearings, thus flushing it thoroughly. When the oil recedes to the opening in the tube, the wick automatically feeds oil to the bearing by capillary action. Dirt or sediment cannot enter the bearing. All metal parts are bright cadmium-plated for beauty and easy cleaning. Made in three styles for one-, two-, and four-ounce capacities.—*Trico Fuse Mfg. Co., 2948 North Fifth St., Milwaukee, Wis.*

■ ■

For more information **"ring 3845"** on coupon

Fire Hose Gasket

Trade Name: Koroseal.

Application: A swivel gasket for both municipal and industrial fire hose.

Features Claimed: The smooth glaze on the surface of Koroseal eliminates the need for spanner wrenches, and makes it possible to tighten couplings using the new gaskets by hand so they are leakproof at internal pressures up to several hundred pounds. They do not harden with age or lose their resilience. Locking and freezing of swivels are eliminated, since the Koroseal gaskets contain no sulphur or other compounding ingredients. There being practically no water absorption by Koroseal the new gaskets do not swell or lose their shapes.—*B. F. Goodrich Co., Akron, Ohio.*

■ ■

For more information **"ring 3846"** on coupon

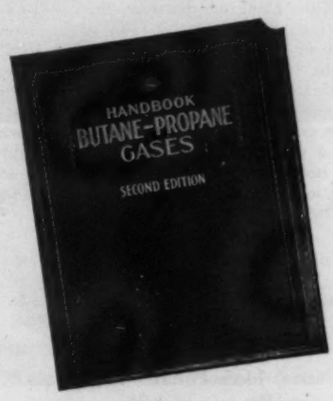
Safety Test Lamp

Trade Name: SG-100 Test Lamp.

Application: A new type test lamp and voltage indicator that features safety and

For more information **"ring 3847"** on coupon

HANDBOOK BUTANE-PROPANE GASES



415 Pages

CONTENTS: Semi-Bulk Distribution: Use of Butane in Buses: Combination Propane Operated Utility Plant: Use in Internal Combustion Engines: Design and Installation of Storage: Supply from Petroleum Refineries: Engineering Data on the Lower Olefins: Domestic Appliance Testing and Utilization: Economical Comparisons with Coal, Oil, Electricty, Producer Gas, Manufactured Gas: Town Plants: Manufacture from Natural Gas: Specal Uses: Volume Correction Factors: Transportation: Use with Other Gases: Analysis and Testing: Properties of Mixtures: Bottled Gas Distribution: Bibliography: Central Plant Directory: Catalog Section.

SECOND EDITION (Latest Revision Nov., 1938)

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GAS

The Natural Gas Magazine

BUTANE-PROPANE News
1709 W. 8th Street
Los Angeles, Calif.

can be used on AC or DC circuits from 110 to 600 volts.

Features Claimed: No fuses required for safety. Only one test lead. Only two parts to handle. Indication bulls-eye in line with test prod movement. No shorting or "splash" can occur. Excessive voltage burns out lamp filament only. Lamp easily replaced. Resistor limits current to such low value that there is no danger of tripping relays when checking control panels. Current values are in milliamperes; a 110-volt circuit indicates about 20 milliamperes light value through the tester; 220 volts, about 40; 440 volts, about 80; and 600 volts, about 110 milliamperes.—*The Sittler Co., 1133 W. Van Buren St., Chicago, Ill.*

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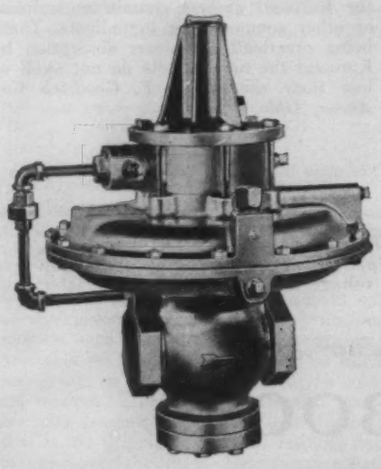
For more information **"ring 3848"** on coupon



Pressure Regulator

Trade Name: EMCO "1001" Regulator.

Application: Designed to provide accurate control for installations having both small and large flow rates, where supply pressures ranging up to 150 lbs. must be reduced to 20 lbs. or less.

Features Claimed: In the design of the EMCO Regulator, a pilot loading system for diaphragm control is incorporated which, it is said, assures the movement of the main operating diaphragm with the slightest change in the control pressure. It is claimed that this principle of control assures the maintenance of the desired pressure at a definite and unvarying amount from minimum flow rates to the maximum capacities which can be obtained under the existing pressure conditions, and that the lock-up characteristics are exceptional. — *Pittsburgh Equitable Meter Co., 400 North Lexington Ave., Pittsburgh, Pa.*

■ ■

For more information **"ring 3849"** on coupon

Strainer

Trade Name: Wright - Austin "Easyclean" Strainer.

Application: A strainer for steam, air, gas, oil, or water.

Description: This strainer is easy to keep clean and easy to connect. A dirt pocket in the bottom of the strainer collects dirt and scale before reaching the screen. Scale and dirt held in dirt pocket are easily discharged through blow-off. When cleaning is necessary open the unions and slip out the strainer. The screen is securely held at each end. It has a large screen area — openings are several times greater than size of pipe. The body is cast semi-steel, suitable for working pressures up to 250 lbs. — *Wright-Austin Co., 315 West Woodbridge St., Detroit, Mich.*

■ ■

For more information **"ring 3850"** on coupon

Portable Printer

Trade Name: Elpro Portable Printer.

Application: To reproduce engineering drawings, letters, reports, maps, any pencil or ink lines, typewritten or printed matter appearing on one side of a reasonably translucent sheet.

Features Claimed: The light source of the printer consists of six specially developed lamps. The case is finished in gunmetal, and aluminum reflector assures uniform light distribution over the printing surface. It has a dry developing chamber, located behind the metal reflector, thus utilizing the heat generated by the lights to vaporize the developing agent. A time switch allows the operator to regulate the length of exposure. The printer can be carried from place to place and used in offices or in the field on jobs. No washing, fixing, or drying is required. — *Ozalid Corp., Ansco Road, Johnson City, New York.*

■ ■

For more information **"ring 3851"** on coupon

Casing Contactors

Trade Name: Security Drillable Liner-to-Casing Contactors.

Application: Used with installations of oil well liners to shunt electric currents flowing between liner and casing, and for cemented or uncemented liners.

Description: Design A-1465 casing contactor mounts directly on the liner and is used where the clearance between liner and casing is slight. Design B-1465 casing contactor is a standard slip-over type, available to fit any size liner and is used when the clearance between liner and casing is sufficient to pass the contactor collars. These contactors are designed for removal with a drilling bit so that their assembly does not impair the drillability of the installation.—*Security Engineering Co., Inc., Whittier, Calif.*

■ ■

For more information **"ring 3852"** on coupon

Portable Dog House

Trade Name: Ideco Portable Dog House.

Application: For use on drilling rigs.

Features Claimed: Explosion-proof lighting with interior and exterior outlets, interior outlets for drinking fountain and plug-in connection adjacent to the derrick leg; built-in clothes hangers, built-in steam heating coils and guard over same; built-in bench, built-in tool board with single panel cover attached on inside; and a portable sub-base of proper elevation. Built-in knowledge box and locker arrangements are made to meet individual requirements. — *International Derrick & Equipment Co. of Calif., 2410 Carson St., Torrance, Calif.*

Before You Buy, Consult the *Latest Trade Literature* Concerning Equipment

This department of GAS will gladly mail you without obligation any of the selected bulletins listed below. Use the coupon on page 55 of this issue, indicating by number above those you desire.

For more information **"ring 3853"** on coupon

Specifications for NO-OX-ID protection to pipe lines. In order to furnish customers with complete information on the proper NO-OX-ID coatings and NO-OX-IDized Wrapper combinations for their individual soil conditions and method of application, the Dearborn Chemical Co. has just issued a series of eight sets of complete specifications. These specifications give proper NO-OX-ID combinations, data on correct applications, figures for quantity required and information on coating mechanics. The company offers a recommendation service on any specific job and will supply a questionnaire upon which it can furnish correct specifications for pipe line protection.

For more information **"ring 3854"** on coupon

"The Control of Speed," a new catalog brought out by the George Sherr Co., is devoted to hand tachometers, speed indicators, cutmeters and various other types of speed measuring equipment and instruments that are used for measuring revolutions per minute of electric motors, machinery, engines, lathes, and practically all types of industrial equipment.

For more information **"ring 3855"** on coupon

"Wilson Arc Welding Electrodes," an illustrated 24-page booklet just issued by the Wilson Welder & Metals Co., Inc., is prepared as a guide in helping to make selections of proper electrodes for all classifications of welding work.

For more information **"ring 3856"** on coupon

The Worthington Pump & Machinery Co. has recently issued several bulletins on pumps, air compressors, all-purpose drills, and pneumatic-feed drifter. The bulletins are numbered W-341-B7, H-620-B22, H-1200-M6, and H-1200-B27 respectively.

For more information **"ring 3857"** on coupon

The entire line of pressure, flow and temperature controls manufactured by General Controls is illustrated and described in a new 48-page catalog.

For more information **"ring 3858"** on coupon

A portable compressor with automatic fuel saver has just been announced by Ingersoll-Rand Co. Detailed information is contained in their bulletin, Form 2641.

For more information **"ring 3859"** on coupon

Catalog 35-X, issued by the Fafnir Bearing Co., gives data on dimensions, load ratings, types and sizes of Fafnir bearings, and also covers a complete line of radial, thrust, precision, self-aligning and sealed bearings and housed transmission units.

For more information **"ring 3860"** on coupon

Reversible wrenches are described in Chicago Pneumatic Tool Co.'s single sheet publications SP-2006 and SP-1971.

35,000 tons of plunging steel

...yet a child could steer it!

THE SECRET? CONTROL

Steering today's dreadnaught requires less brawn than guiding a baby carriage. The mighty bulldog responds instantly to the slightest touch of a hand on a tiny lever. That's *efficiency* through *control!*

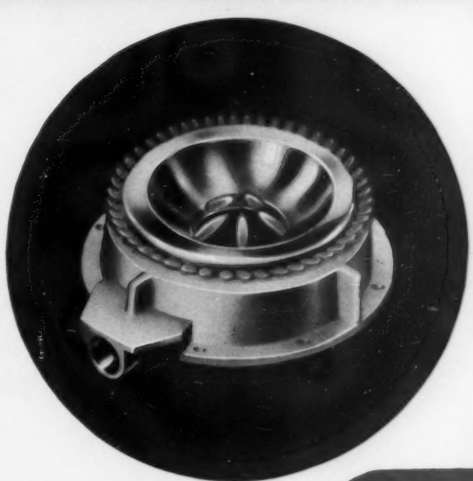
Likewise, the efficiency of gas cooking has been increased many fold by another modern system of control . . . the Harper Burner System. It has taken the *guesswork* out of cooking by bringing to today's gas range accurate responsiveness to every heat requirement to a degree approached by no other cooking unit. Small wonder the gas industry is displaying so much interest in the Harper Burner System . . . daily it is selling more housewives on *gas.*

CONTROL *is the secret here, too*

● The Harper Burner System is a patented invention whereby each of the burners on the range is actually 2 burners in 1 . . . a burner within a burner . . . both operated and controlled by a single handle.

This arrangement affords a high-speed STARTING BURNER to *start* foods boiling and for fast frying . . . plus a small, central, economical COOKING BURNER for *maintaining* the cooking. The COOKING BURNER can be used entirely independently of the STARTING BURNER. No other top burner possesses this vital advantage — which insures easy, accurate control: just the right heat for every type of top-burner cooking . . . every time.

HARPER-WYMAN COMPANY
8562 Vincennes Avenue, Chicago, Ill.



HARPER BURNER SYSTEM

HARPER BURNER SYSTEM

Demonstrates GAS at its best

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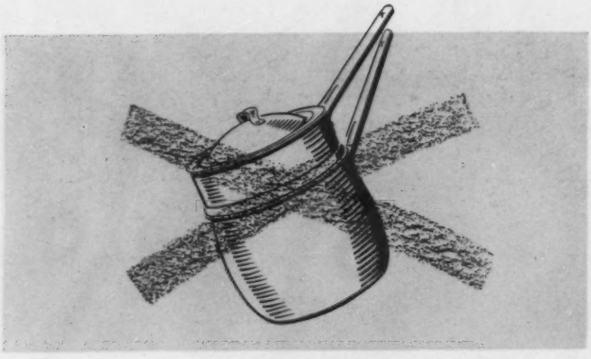
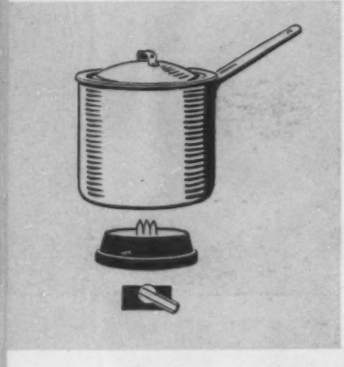
No double-boiler is needed
with the Harper Burner System



● With ordinary burners, most people find it necessary to use a double-boiler when cooking cereals or semi-liquids. But with the Harper COOKING BURNER, the direct flame way is quickest, easiest, and most efficient.

It is only necessary to use a fairly heavy vessel (to properly conduct the heat) and lower the COOKING BURNER to between one-half and three-fourths height. Stirring once or twice during the cooking time is desirable, just as in using a double-boiler.



This is another salient advantage of the Harper Burner System. Heat can be accurately controlled down to the lowest point . . . to a degree impractical with other top burners of the "simmer" type.

If a double-boiler is preferred, the Harper COOKING BURNER still is ideal. The handle is simply turned to *full* cooking flame after brisk boiling with the STARTING BURNER for three or four minutes.

This flexible, simple, and accurate control that makes for so much better and more economical cooking, is of interest to the gas industry, and important to the promotion of gas appliances. Every time the Harper Burner System is demonstrated, GAS is truly presented at its best.

The Harper Burner System provides a burner within a burner. The diagram above shows how the COOKING BURNER operates entirely independently of the STARTING BURNER. Yet both are controlled by the same handle.

We shall be glad to send you, without cost, two booklets that tell the complete Harper Burner System story . . . "Modern Methods of Top Burner Cooking" and "The Greatest Cooking Discovery in 40 Years". They should be valuable to anyone interested in the promotion of gas cooking and gas appliances. *Harper-Wyman Company, 8562 Vincennes Avenue, Chicago, Ill.*

HARPER
BURNER SYSTEM

HARPER BURNER SYSTEM

SEE OTHER SIDE OF THIS PAGE

PUAA Committees Organize Program for June Meeting

FINISHING touches are now being put on the program for the Public Utilities Advertising Association annual convention to be held in Chicago, June 23-26, it has been announced by the local arrangements committee, headed by Clayton G. Cassidy, advertising manager, Peoples Gas Light & Coke Co., Chicago.

Regular sessions of the Association will be held at the Palmer House Monday morning, June 24, and all day Tuesday, June 25. Present plans include an open house Sunday afternoon, sightseeing, golf, and other entertainment. The program has been arranged so that the sessions will not conflict with the general sessions of the Advertising Federation of America convention, held in conjunction with the PUAA meeting.

Keith Hartzell, president of the Association, has announced that plans are being made for displaying at the Palmer House all non-winning material submitted in the Better Copy Contest. J. W. Hicks, publicity director of the Public Utility Engineering & Service Corp., Chicago, is in charge of the exhibit.

The nominating committee, recently appointed by Mr. Hartzell, will report at the convention. Serving on the committee are: H. F. Weeks, Consolidated Edison Company of New York, chairman; R. S. McCarty, Duquesne Light Co.; J. C. Barnes, New Orleans Public Service Co.; Ken Magers, Cincinnati Gas & Electric Co.; George Webber, Consumers Power Co., Jackson, Mich.

■ ■

Montana Towns To Be Served Through New Pipe Line

The Montana-Dakota Utilities Co., Minneapolis, which owns and controls gas interests in the Bowdoin Field, is contemplating the construction of a natural gas pipe line from Fort Peck, Mont., to a point near Glendive, according to Raymond Hildebrand of Glendive, attorney for the company. There it will connect with the company's transmission line emanating from the Glendive-Baker gas field. The new line will serve the towns of Circle, Poplar, and the City of Wolf Point with gas. The estimated cost of the contemplated construction will be over one million dollars.

The Montana-Dakota company has filed an application with the Federal Power Commission for authorization of a proposed financing plan.

■ ■

Carmi and Salem, Ill., Will Get Natural Gas

Carmi and Salem, Ill., are expected soon to have natural gas from the newly discovered Storms oil and gas field located six miles south of Carmi and considered to be one of the ranking fields in the state.

W. R. Stinnett has been granted a 25-year franchise by Carmi and expects to start construction of a plant and distribution system. The system in Salem will be municipally owned, funds having been voted in the form of a bond issue by the residents in April.

■ ■

Arizona Employes Succumb

Two employes of the Arizona Edison Co. died recently in their respective districts.

R. F. Smith, superintendent of the company at Douglas, Ariz., passed away early this year.

Stanley F. Jewell, manager of the company at Yuma, was drowned in April.

Among the 300 representatives attending the Mid-West Gas Association annual convention at Lincoln, Neb., April 15-17, were (left to right): Vierigg Murphy, Pat Maynard, Fred J. Gunther, H. W. Smith, C. B. Dushane, Jr., Charlie Smith, H. R. Otterbein, H. E. Peckham, Tom Lucas, Tom Conners, Roy B. Searing, Hal Gildersleeve, A. T. Barrett, and R. F. Henneman. — Photo by R. W. Stafford, Connelly Iron Sponge & Governor Co.

Mid-West Association Invites Three New States to Annual Convention

BY INVITING three new states — Montana, Wyoming and Colorado — to join its organization, the Mid-West Gas Association, at its recent convention at Lincoln, Neb., April 15, 16 and 17, enlarged its scope to cover eight states. The original five states are Iowa, Minnesota, North Dakota, South Dakota and Nebraska. Approximately 300 gas utility men and equipment manufacturers attended the 35th annual meeting, which, according to officials, was one of the organization's finest.

C. B. Dushane, Jr., American Meter Co., Chicago, was elected president for 1940-41; H. E. Peckham, Northern States Power Co., St. Paul, Minn., was elected first vice president; H. K. Wrench, Minneapolis Gas Light Co., became second vice president; and R. B. Searing, Sioux City Gas and Electric Co., was re-elected secretary and treasurer. Minneapolis was awarded the 1941 convention.

New members of the executive council (three year term) include B. R. Bay, Omaha; R. E. Crawford, St. Peter, Minn.; Capt. A. E. Higgins, Pittsburgh; and R. F. Henneman, Ottumwa, Iowa. C. P. Williams, Sioux City, Iowa, was elected to fill an unexpired term.

R. E. Campbell, mayor of Lincoln and an engineer by training, welcomed the Association by saying: "Who wants to go back to the 'good old days'? Who wants to get up early, shake out the ashes, try to revive the dying embers? As for me, I use gas."

L. R. King, president and general manager of the Iowa-Nebraska Light and Power Company, responded to Mayor Campbell's remarks, and welcomed the assembled delegates on behalf of his, the host, company.

Discussing the advantages of transmission of natural gas and the resultant economy after changing from manufactured gas, retiring president Fred J. Gunther said:

"Nebraska, Iowa, Minnesota, North Dakota and South Dakota, represented by the Mid-West Gas Association, have been unusually fortunate in being able to participate in the economic advantages from the long distance transmission of natural gas in the mid-continent section. In 1933, just a few years after its introduction more than 28 billion cu. ft. were distributed in these states; in 1938, it reached 50 and a half billion."

Other speakers on the first day's program were George E. Frazer, Chicago; John E. Bogan, assistant promotion manager of the Association of Gas Appliance and Equipment Manufacturers in New York; H. E. Peckham of St. Paul; R. F. Henneman of Ottumwa; and a dramatization of romance in gas cooking by A. T. Carrow and Charles T. Dukes, representatives of Cribben & Sexton Co. in Chicago.

Enthusiasm for gas as a heating fuel was reflected in the constructive remarks of J. E. Swenson, Minneapolis Gas Light Co., who opened the second day's session with a discussion on "The Organization of a Heating Sales Campaign." John Jameson, vice president of McCann-Erickson, Inc.,

outlined the achievements of a continuous national advertising campaign conducted by his firm in behalf of the gas industry nationally under A. G. A. sponsorship.

Walter C. Beckjord, president of the American Gas Association, impressively discussed the future of the gas industry and traced its progress to date, stating: "The frontiers of expansion are not closed for the gas industry, for there is still great room for development." He reminded the group that "this industry is 125 years old. Our record is exceptional for we have been flexible enough to rapidly adjust ourselves to changes and yet stable enough to maintain a record that cannot be challenged. There are few industries of 125 years ago that are in existence today."

W. J. Barber, Metropolitan Utilities District, Omaha, presented the report of the affiliated representative on the Commercial section of the A. G. A. management committee. Mr. Barber will be succeeded at this association post for 1940-41 by Hal Gildersleeve, assistant general manager in charge of merchandising for the Iowa-Nebraska Light and Power Co.

With stage settings and prologue under the direction of H. D. Valentine, Peoples Gas Light & Coke Company, Chicago, a dramatization entitled "Life Begins in '40 for Gas Refrigeration," was presented by Bernard T. Franck, chairman of the A. G. A. refrigeration committee and vice president of the Milwaukee Gas Light Co.

William E. Leverette, sales manager of the Nashville (Tenn.) Gas and Heating Co. presented the problems of a gas utility faced with TVA competition. Harold W. Stanton, commercial sales engineer for the Iowa-Nebraska Light and Power Co., Lincoln, closed the second day's speaking program with a formula for finding "Your 1940 Hidden Market." Mr. Stanton illustrated his points with various gas-fired devices.

"The Future of Gas as the Comfort Fuel" was discussed by Keith T. Davis, in charge of engineering for the L. J. Mueller Co., Milwaukee. Mr. Davis estimated there are nearly 2,500,000 installations in the nation, using either natural or manufactured gas for fuel. He urged delegates to drive hard for wide spread public acceptance of gas as the home heating fuel, saying as the new home load increases, so eventually will the old home market.

Under the direction of C. A. Nash, United Light and Power Service Co., Davenport, Iowa, a dramatization entitled "Information Please," enacting the most common customer questions and methods for answering them was presented by D. D. Williams, Otto Ress, James Q. Palmer and C. C. Hellmers, Jr., all of the Iowa-Nebraska Light and Power Company.

C. B. Dushane, Jr., of American Meter Co.'s Chicago office was elected president for the 1940-1941 term.

■ ■

Long Beach To Build Butane Standby Plant

The City of Long Beach (Calif.) has retained Harold W. Wickstrom, consulting engineer of Los Angeles, to furnish plans and specifications for a butane-propane air mix standby plant to augment their natural gas supply during peak loads, and to provide standby service in case of line failure.

The plant will have a capacity of 500,000 cu. ft. per hour and sufficient storage for liquefied petroleum gas will be provided to take care of an equivalent of approximately 50,000,000 cu. ft. of natural gas.

The City of Long Beach operates a municipal gas distribution system and obtains their natural gas from the nearby oil fields. The Long Beach Gas Department serves approximately 50,000 consumers with an annual send-out of over 3,500,000,000 cu. ft.

■ ■

New High Pressure Main For Iowa Town Addition

At a cost of approximately $20,000, the Iowa Public Service Co. plans to complete before fall a new 6½-mile-high pressure gas main to the Prospect Hills addition of Waterloo, Iowa. This will be to augment the present supply, according to Arnold Rathkey, division gas engineer for the utility, and is necessitated by increased building activity in the residential subdivision.

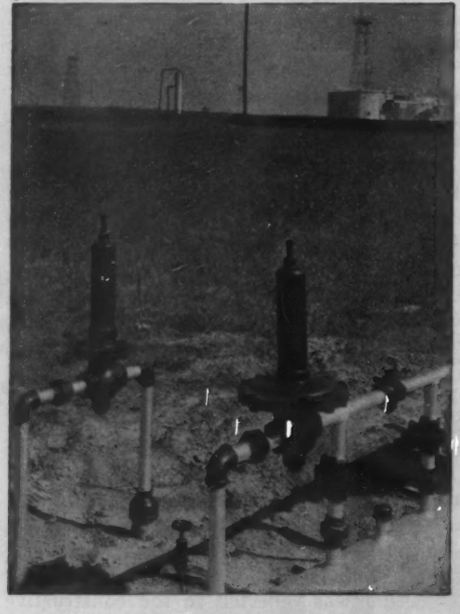
Attached to the new high pressure line will be a regulator to feed gas into the present low pressure distribution mains in that area.

■ ■

Ohio Fuel Co. Moves

The Ohio Fuel Gas Co.'s Cleveland offices are now established at 5437 Pearl Road, having been moved this spring from 5412 State Road.

Spring Regulators on the Lines of a Big Gas Company



The C-F Regulators here pictured are on lines of an important producing company in the Texas gas field. One for high pressures, the other for low, they are seen to be of the spring-loaded type which, in some services, is preferred for its compactness and its relative immunity to accident or meddling, as compared with the weight-and-lever type. C-F Regulators are made and approved for all requirements of pressure control.

Write for new Catalog.

The CHAPLIN-FULTON MFG. CO.

28-40 PENN AVE. CF PITTSBURGH, PA.

Nationwide Cooking Schools Feature George Rector

A SERIES of Gas International Cooking Schools, featuring George Rector, nationally known restaurateur, and sponsored by the A. G. A. Commercial Section and the Associated Merchandising Corp. of New York City, was completed May 29 with a two-day session held in Los Angeles. The schools were held throughout the country in department stores affiliated with the Associated Merchandising Corp.

The program for each school scheduled five classes for a two-day period, and was arranged to allow a home service representative from the local gas company to assist Mr. Rector and participate in the program. In addition to Mr. Rector's preparation of his famous dishes, his cookbook, *At Home on the Range*, was made available to those attending the classes.

In each city the schools were advertised in advance by the department stores, radio broadcasts and special newspaper items and editorials.

■ ■

S. C. M. A. Holds Meeting; Announces Low Jinks

The Southern California Meter Association held its regular monthly meeting May 23 at Huntington Park, Calif. The discussion was led by W. L. Cowan of the Union Oil Co., who is chairman of the California Natural Gasoline Association. "The Discussion of Sampling Gases at Reduced Pressures for the Determination of Specific Gravities by the Edwards Balance" was delivered by George H. Forster, Jr., of The Texas Co. Two motion pictures were shown through the courtesy of Lane-Wells Co., entitled "Bullets for Oil" and "Lane-Wells Electrolog." Entertainment during dinner was furnished by the Robinson Orifice Fitting Co.

The June meeting will be the Association's fourth annual Low Jinks, to be held June 27 at Rio Hondo Country Club.

■ ■

Gas Heaters Included In EHFA Finance Program

The list of domestic gas appliances which may be financed under the Electric Home and Farm Authority plan has been extended to include circulating gas heaters and gas-team radiators, it was announced recently by Henry D. Brite, commercial manager. Under the plan specified appliances are financed by the EHFA for a minimum down payment of 5% of the cash price of the installed appliance, and a maturity maximum of 36 months. Sales of two or more major gas appliances have the maximum maturity period extended to 48 months.

■ ■

Robt. Mueller, Vice President Mueller Co., Passes

Robert Mueller, vice president in charge of public relations of the Mueller Corp., Decatur, Ill., passed away March 27, on his seventy-sixth birthday. Mr. and Mrs. Mueller were spending the winter in Florida, and at the time of his death were at Bradentown.

■ ■

Nashville Gas Man Dies

Funeral services for Jones J. Morell, Nashville (Tenn.) Gas & Heating Co. emergency man, were held May 13. Mr. Morell died after an illness of two weeks.

Cabinet Heater

Forced-Air Unit

Floor Furnace

NEWLY ENLARGED "PACIFIC" PLANT ON CAPACITY PRODUCTION

Demand for Products Reflects Quality Due to 27 Yrs. Specialization in Gas Heating Appliances

BY RAIL, highway and water large daily shipments of Pacific Products are speeding to every corner of the country to meet the steadily growing demand for these time-tested, ultra-modern gas heating and ventilating appliances. This industrial progress is the result of consistent and specialized development of Gas Heating Equipment over a period of 27 years combined with a company policy that adequately protects Pacific Dealers and Customers.

Pacific embraces a complete line of Forced-Air Winter and Summer Air-Conditioners . . . Gravity Units . . . Blowers . . . Floor Furnaces . . . Cabinet Heaters . . . Gas Steam Radiators . . . Wall Heaters and Water Heaters for Natural and Manufactured Gas fuels. Installation of the proper units is assured by selected dealers and Pacific Engineering service geared to deliver 100% satisfaction. Write TODAY for Free catalog featuring complete line of Pacific Products.

PACIFIC GAS RADIATOR COMPANY
Main Office and Factory: Huntington Park, California
(Dept. G-6)

MUELLER GAS DISTRIBUTION EQUIPMENT

The time-tested Mueller line includes Mueller Evenflow Service Regulators, Gas Stops, Service Stops, Stove Stops, Drilling and Tapping Machines, service boxes, meter trims and similar equipment. Write for description and prices.

MUELLER CO., Los Angeles, Calif.

Factories: Decatur, Ill.; Chattanooga, Tenn.; Los Angeles, Calif.; Sarnia, Ont.
Branches: New York and San Francisco

INDUSTRY *Personalities*

James R. Scott, for the past seven years in the sales and engineering departments of Surface Combustion Corp., has been appointed assistant to the president, H. P. Mueller, of L. J. Mueller Furnace Co., Milwaukee, Wis. Mr. Scott is a graduate of the University of Illinois. Prior to his position with the Surface Combustion Corp. he was manager of the gas heating division of American Foundry & Furnace Co. for four years. With the Mueller company, Mr. Scott's duties are to assist the president in all matters pertaining to sales, equipment design, engineering and plant operation. He assumed the new position April 1.

E. J. Hatzenbuehler, manager of the Industrial Department of Lone Star Gas Co., Dallas, has recently announced that the department's name has been changed to Industrial and Commercial Sales in order to cover extended activities. As manager of the expanded department, Mr. Hatzenbuehler will have supervision and control over all activities of the department in properties of Community Natural and Texas Cities Gas Companies. **T. J. Skrabanek**, assistant industrial engineer, will be assistant manager of the new department.

Other changes in the Lone Star personnel include the appointment of **E. Allen Brown** as assistant to **L. T. Potter,** chief production engineer. **J. W. Burrage** has been named field supervisor for the same department, and **Charles T. Dean** is now district production engineer in the West Central District.

E. J. Weikel, formerly district storekeeper at Mexia, Texas, for the Community Natural Gas Co., has recently been appointed subdistrict manager for the company with headquarters at Lancaster, Texas.

R. F. Brockschmidt, industrial engineer for Community Natural Gas Co., has recently established headquarters in Bryan, Texas, where he will supervise commercial and industrial gas service in Bryan, Cameron, Taylor, Georgetown and Brenham Districts.

Lucie Lee Carley, home economics director for the Fort Worth Division, Lone Star Gas Co., was recently awarded a medal for driving an automobile 12,900 miles in two years without a fender scratch. Miss Carley was the only woman among 67 employes who were given safe driving medals at the division's annual safety meeting, and is the first woman employe of the Lone Star System to receive the honor.

William A. Hudson has been appointed manager of the Domestic Sales Division of the Laclede Gas Light Co., St. Louis, Mo., it was announced recently by **L. H. Spiner,** executive assistant to President L. Wade Childress of the company. Mr. Hudson joined the Laclede organization in 1939, coming here from Houston, Texas, where he was general sales manager of the Houston Division of the United Gas Corp.

W. A. HUDSON

After graduating from Vanderbilt University, he took a position with the by-product plant of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala. A year later he accepted a position with the Birmingham Electric Co., a combination electric and gas utility, and was placed in charge of househeating sales. During 1930 and 1931 he made gas surveys of company properties at Staunton, Va., and Jacksonville, Fla. He later was made general sales manager at Birmingham and in 1937 accepted a position with the United Gas Corp.

Flora G. Dowler has been appointed home service director of the Pittsburgh Group of Columbia System Utilities, it has been announced by **W. L. Hutcheson**, sales manager. Miss Dowler comes to the Pittsburgh Group from the Binghamton Group where, for six years, she headed the Home Service Department.

Edwin L. Hall has recently been appointed manager of the Manchester (N. H.) Gas Co. Prior to his appointment Mr. Hall was research engineer for the United Gas Improvement Co. He succeeds **Howard B. Noyes,** who has accepted a position with the Washington (D. C.) Gas Light Co. Mr. Hall has been with the U.G.I. system since 1924, and from January, 1937, he was in charge of the U.G.I. Engineering and Research Laboratories.

Harold J. LaWall, assistant to vice president, operating department, the United Gas Improvement Co., completed 40 years of service with the company on April 20. The employes of his department presented to him a cigarette case and fountain pen, and Vice President Rutledge commended him upon his service during the 40 years.

Wenzel Helwig, after 38 years of continuous service in the office of the municipally-owned gas plant in Lancaster, Ohio, has resigned because of impaired health. He was chief clerk at the time of his retirement, a position he had held for 27 years. **Edward R. Ray** will be his successor.

Clarence L. Law, vice president, **Harold S. Sutton**, executive assistant to the chairman of the board, and **Henry Obermeyer**, assistant vice president of Consolidated Edison Company of New York, Inc., are in charge of plans to add four entirely new exhibits to the company's "City of Light" diorama at the 1940 New York World's Fair. The new exhibits, designed by **Walter Dorwin Teague**, will portray in animated form the material published in the company's annual report to customers, issued for the first time this year.

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GAS APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

FINAL PERIOD OF AUTOMATIC GAS WATER HEATER CAMPAIGN

The $12.00 trade-in allowance and the P. G. and E. cooperative advertising plan which have boomed automatic gas water heater sales during the past month will continue in effect during the coming month. Make the most of this campaign! Push the throttle down to the floorboard and keep it there until June 30. With blotters, advertising layouts, bumper strips, mat service, display cards and FREE CASH to pay 1/3 of newspaper space costs, this 1940 campaign offers more dealer assistance than any other water heater campaign in P. G. and E. history. We believe it will make you more enthusiastic than you have ever been for cooperative selling.

THIS MONTH ONLY

G 106-640

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Gas Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Gas Appliance Society, 1355 Market Street, San Francisco, California.

Thomas W. Halloran, gas sales advisor for New York Power & Light Corp., Albany, was recently appointed gas sales and utilization engineer. In his new position, Mr. Halloran will have charge of all gas sales, sales promotion and utilization problems, and control of stocks and types of equipment.

Gladys Vaudreuil, formerly home service director of the Northern States Power Co., Stillwater, Minn., has been appointed home service director of the Roanoke Gas Co., of Roanoke, Va.

C. W. A. Remschel, gas engine sales engineer of Southern Counties Gas Co., Los Angeles, has retired as of June 1, 1940, under the company's uniform pension and benefit plan. Mr. Remschel has been with the company for 10 years, in which period he established an enviable reputation as an authority on natural gas engines. A graduate in electrical engineering of the Ballarat School of Mines, which is a branch of the University of Melbourne, Australia, he has been employed successively by the Hawaiian Electric Co. in Honolulu, the Westinghouse Electric & Manufacturing Co. in San Francisco, the old Edison Power & Light Co. of San Francisco, and Allis-Chalmers, Seattle.

C. REMSCHEL

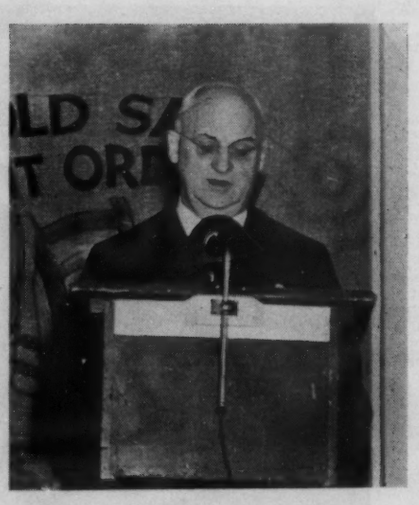
Mr. Remschel has distinguished himself in the gas industry by the contribution of many technical articles on natural gas engines to various trade journals. His most noteworthy achievement in this field, however, is the preparation and writing of a *Gas Engine Handbook*, which was published by A. G. A.

Upon his retirement, Remschel will spend two months in traveling along the Atlantic seaboard, and on his return to Los Angeles he will engage in an engineering business, specializing in the design, sale and installation of electric, hydraulic, natural gas and diesel engines.

Allen Van Wyck, formerly a senior vice president, was recently elected president of the North American Light & Power Co., a subsidiary of the North American Co., New York. He has also been elected president of Illinois Iowa Power Co., a company controlled by North American Light & Power Co., and as operating head of the midwestern company he will have headquarters at Decatur, Ill.

J. M. Young, manager of the Gulf Cities Natural Gas Co., has been promoted to division superintendent of Gulf Cities division, Houston Natural Gas System. **Harry F. Massey**, who was assistant manager to Mr. Young, has been appointed as district manager. The announcement was made recently by **Curtis H. Fisher**, general superintendent of the system.

John F. Devaney, of the Cincinnati (Ohio) Group of Columbia System Utilities, was honored recently at a dinner given for him in recognition of his retirement after 44 years of service. Born in Ireland, Mr. Devaney came to the United States in 1896 and started working for the company in Cincinnati.



Bruno Rahn, president of Milwaukee Gas Light Co., was elected president of the Wisconsin Utilities Association at the Annual Convention held in Milwaukee in March.

C. H. Rickert, assistant to the treasurer of the Philadelphia Co., Pittsburgh, Pa., and its subsidiaries, has been appointed office manager of the treasury department, it was announced recently by H. D. Megahan, treasurer. **L. H. Phillips** succeeds Mr. Rickert as treasurer's assistant.

Edward F. Healy, an employe of the New Haven Gas Light Co., New Haven, Conn., was recently presented the McCarter Medal and Certificate for having saved the life of a woman who had been overcome by gas.

Dr. R. R. Sayers, senior surgeon of the United States Public Health Service and formerly safety director for the Bureau of Mines, was recently appointed director of the Bureau of Mines by President Roosevelt. Dr. Sayers succeeds John W. Finch, who resigned January 31.

John H. Martin, at 92 years of age, is still on the payroll of the New York Power & Light Corp. Mr. Martin became an employe of the gas company in 1860 at the age of 12, and retired with a pension in 1921. In addition to being on the payroll 80 years, Mr. Martin served the company 61 years without losing a day's pay.

Walter D. Howell, of the Pacific Gas & Electric Co., San Francisco, has been awarded an Alfred P. Sloan Foundation fellowship for a year in advanced study in economics and industrial administration at the Massachusetts Institute of Technology. He is one of 11 young executives nominated by companies in all parts of the country for this honor, which carries a fund of $2500 to each.

Ben Kaufman, assistant director of dealer and employe cooperative sales, Cincinnati (Ohio) Group of Columbia System Utilities, was honored recently by his colleagues for having completed 25 years of service with the company. Mr. Kaufman joined the company as a cooperative employe while attending the University of Cincinnati.

Dr. N. K. Chaney, research director of United Gas Improvement Co., Philadelphia, Pa., was recently awarded a "Modern Pio-

EXCLUSIVE design of Mueller Gas Era Furnace gives longest life—lowest operating cost.

L. J. MUELLER
FURNACE COMPANY
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neer" scroll by the National Association of Manufacturers in recognition of his achievements. Mr. Chaney has done research work in the field of carbon activation, and contributed to the development of the gas mask.

John Rogers has joined the Cooper-Bessemer Corp. in a sales engineering capacity and will soon take up his duties as Pacific Coast manager at the company's Los Angeles offices, it has recently been announced by the company. Simultaneously, the transfer of **J. W. Reed** from the Los Angeles to the New York offices has become effective, with Mr. Reed being appointed Atlantic Coast manager of the corporation's gas engine and compressor division. Mr. Rogers is a native of Ohio, and was graduated from the University of Southern California, department of mechanical engineering, in 1911. He then joined the Frank J. Kimball Co., an organization devoted to oil field and irrigation engineering.

JOHN ROGERS

In 1916 he became affiliated with the Ingersoll-Rand Co. as engineer, with sales duties in their western territory. During the World War Mr. Rogers served the Canadian government in a marine salvage engineering capacity, and rejoined Ingersoll-Rand after the war.

Gerald F. Wilson, for the past 15 years associated with the gas industry, has been appointed district manager of the West Virginia Natural Gas Co. and the Manufacturers Light & Heat Co. in Wheeling, W. Va. He succeeds **H. L. Bennett**, who passed away on March 23.

B. F. Kennedy has been promoted to superintendent of the Gas Service Co. at Valley Falls, Kan. Mr. Kennedy has been associated with the Gas Service Co. since 1930 in the Service Department.

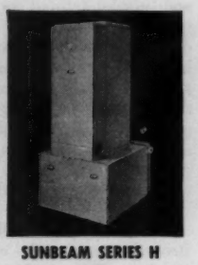
W. R. Murrow, manager of the Independence District of the Kansas Gas & Electric Co. for 29 years, retired April 25. **J. D. Turner**, of the El Dorado Division, will succeed Mr. Murrow. **H. P. Horine** will be transferred from Independence to take charge of the El Dorado Division.

A. G. Beisenherz was re-elected president of the Missouri Gas & Electric Service Co., Lexington, at a recent meeting of the board of directors. **Emmett Page** of Marshall was re-elected vice president, **Murray Boogher** as secretary-treasurer, and **D. E. Littlejohn**, assistant secretary.

Guy Luneau has been promoted to manager of the Monticello district for the Arkansas-Louisiana Gas Co., Shreveport, La. Mr. Luneau was manager for eight years of the Warren office of the company. **J. Fred Gresham** succeeds Mr. Luneau as manager of the Warren office.

Charles B. Seidenglanz, for 10 years associated with his father, Charles H. Seidenglanz, now deceased, in the business operations of Seidenglanz & Co., Dallas, Texas, will succeed his father as head of the firm, it has been announced recently. The company is southwest representative for Reynolds Gas Regulator Co., General Gas Light Co., and Cleveland Heater Co.

SUNBEAM SERIES HL
Modern, efficient, good looking. Has rugged cast iron heating element. Designed with low over-all height for low basement applications. Available in four sizes with capacities ranging from 80,000 to 150,000 B.T.U. input per hour.



SUNBEAM SERIES H
A low-cost cast iron unit. Series H has return air inlet at rear. In 4 sizes from 75,000 to 150,000 B.T.U. input per hour. Series HV has return air inlet through bottom. In 2 sizes — 55,000, 75,000 B.T.U. input per hour.

SUNBEAM SERIES SL
Combines high quality and low cost. Beautiful, efficient, economical in operation. Cabinet encloses all controls and is of low over-all height. Steel heating element. Available in 5 sizes from 70,000 to 150,000 B.T.U. input per hour.

SUNBEAM SERIES SU
A space-saving, money-saving Air Conditioner. Designed for homes without basement or where basement space is limited. Heating element is constructed of durable steel. Five sizes from 70,000 to 150,000 B.T.U. input per hour.

4 NEW
SUNBEAM
Gas Fired
AIR CONDITIONERS

TURN THE Springtime into Sales-Time — right now! Feature the four fine Gas-Fired Sunbeam Air Conditioners — specifically designed to bring you business in small and average size homes.

The HL and H Units have cast iron heating elements — never before incorporated in Air Conditioners of comparable cost. The SL and SU offer all the advantages of steel construction at its best!

All four Sunbeam Units are soundly engineered, precision built—designed to provide years of satisfactory service and economy. Write today for complete information.

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COSTS NO MORE THAN OTHERS

Visit our building and exhibit at the New York World's Fair. Ask for Mr. Frank Stubbs, the American - "Standard" Exhibit Manager.

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Plumbing Fixtures & Fittings · Air Conditioners
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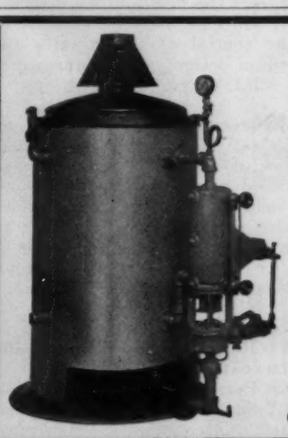

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ASME Code for 100 lbs. S.W.P., also for higher pressures.
Non-electric Low Water Cut-offs for all types of boilers.

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Full power motor.
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Large volume, slow speed blower.

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Constant pressure regulator.
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Unsurpassed Fraser quality builds customer satisfaction.

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GAS HEATING EQUIPMENT

DEPENDABLE *Automatic* GAS HEAT WITH

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MODEL 200 THERMASTER
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TRANSFORMER, WIRE, FITTINGS

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CURRENT *Reading*

Percussive Welding — F. J. Oliver. *Iron Age*, April 14, 1940, pp. 40-43. Some recent developments have been made in the percussive welding process which increase the range of usefulness of this technique. Percussive welding is defined as a resistance butt welding process wherein electric energy is suddenly discharged across the contact areas to be welded and a hammer-like blow is applied simultaneously with or immediately following the electric discharge. This article describes one of the latest adaptations of the percussive welding process, known as the Vanco process. Some of the possible applications of this process are listed.

The Compressibility of Gases — G. G. Brown. *Petroleum Engineer*, April, 1940, pp. 132, etc. Part 4. Methods of approximation.

Thermal-Conductivity-Type Gas Analyzers — C. A. Hansen, Jr. *General Electric Review*, April, 1940, pp. 166-169. Continuously indicates gas purity. Gives alarm at any present value. Primarily designed for use with hydrogen-cooled machines. Construction, operation, accuracy.

Full-Scale Pressure Maintenance Under Way in K.M.A. Field — D. H. Stormont. *Oil and Gas Journal*, April 4, 1940, pp. 34-37, 57. Full-scale pressure-maintenance operations are now getting under way in the K.M.A. field of North Central Texas. This project, which involves an area of over 25,000 producing acres, almost 1300 producers and the interest of 143 operators, is the largest such program ever undertaken in the oil industry's history. When fully under way all available gas will be processed in the field's five natural-gasoline and recycling plants and after being compressed to pressures ranging from 1200 to 1800 lbs., the residue will be returned to 100 or more input wells strategically located throughout the field. Illustrated.

Bottom Hole Control of Gas Production to Improve Gas-Oil Ratio — E. W. McAllister. *California Oil World*, April 2, 1940, pp. 58, etc. The flow controls described in this paper are ingenious and effective devices for the control of gas-oil ratio (upward). Details of design and performance are quoted. An A.P.I. paper.

A.G.A. Proceedings, 1939 — American Gas Association. This is the Association's annual review of the year's work and contains a detailed record of the 21st annual convention held in New York last October. Representative papers presented during the year by the gas industry are printed in the volume. Price to members, $3 — to non-members, $7.

U. S. Bureau of Mines Report of Investigation (R. I.) 3514, "Equilibrium Cell for Investigating Properties of Fluids from Petroleum and Natural Gas Reservoirs," by Eilerts, Smith & Wright. This cell and its accessories are constructed for operation at pressures up to 5000 lbs. per sq. in. absolute, and for range of temperatures common to petroleum production. The cell is equipped for measuring the dew point, saturation, pressure and specific volume of hydrocarbon mixtures being investigated with the particular function of providing phases of natural hydrocarbon mixtures in equilibrium for sampling and analysis by fractional distillation.

Dehydration for the Smaller Natural Gas Pipe-Line Systems — J. E. Moore. *Petroleum Engineer*, Mar., 1940, pp. 181, 182. When investment in modern, automatic dehydrating equipment is out of the question, small operators can obtain satisfactory results by using inexpensive, field-fabricated brine contactors or "bubblepots."

Hydrate Control in High-Pressure Condensate Lines — R. M. Hutchison. *Petroleum Engineer*, Mar., 1940, pp. 146, 147. Stage pressure reduction and condensate removal combined with application of controlled heat and insulation represent probably most economic and efficient method. Illustration shows a typical installation.

Combustion Calculations Using the Mol — H. L. Norris, Jr. *Combustion*, Mar., 1940, pp. 41-44. For those having to do with combustion calculations, use of the mol system is a time saver. This is explained and discussed with reference to the burning of coal, natural gas and oil, and convenient charts applicable to each of these fuels are included.

A.S.T.M. Standards (including Tentative Standards). Published by the American Society for Testing Materials, 1939, 3 Parts. Part 1, Metals; Part 2, Non-Metallic Materials, Constructional; Part 3, Non-Metallic Materials, General.

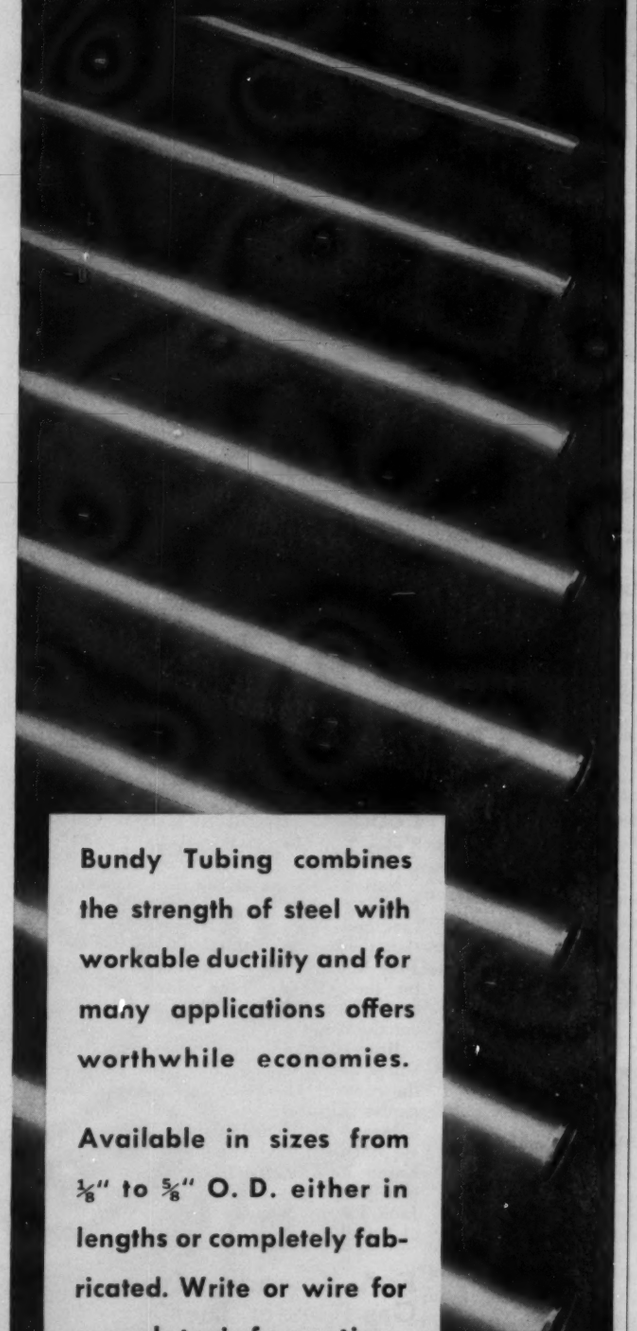
Experimental Plant at Cotton Valley Proves Recycling to be Feasible — George Weber. *Oil and Gas Jour.*, Mar. 7, 1940, pp. 32, 33. The Cotton Valley field of Webster Parish, North Louisiana, comprises one of the outstanding gas-condensate reserves thus far discovered. Its potentialities for the adaptation of recycling and pressure maintenance have been widely recognized and plans are under consideration for application of this principle to the field's production. To that end the Cotton Valley Engineering Committee has made extensive field tests. An experimental recycling plant has been installed and operated in the field to add to the data required for formulating a field-wide recycling project. Described and illustrated.

High Rotary Speeds in California Drilling — Wallace A. Sawdon. *Petroleum Engineer*, Mar., 1940, pp. 33, 34. Speeds as high as 750 r.p.m. have been used; as much as 1080 ft. of hole has been drilled in nine hours; rock bits used almost entirely in high-speed operations.

BUNDY TUBING

(COPPER COATED STEEL)

Offers Many Advantages in Gas Appliance Manufacture



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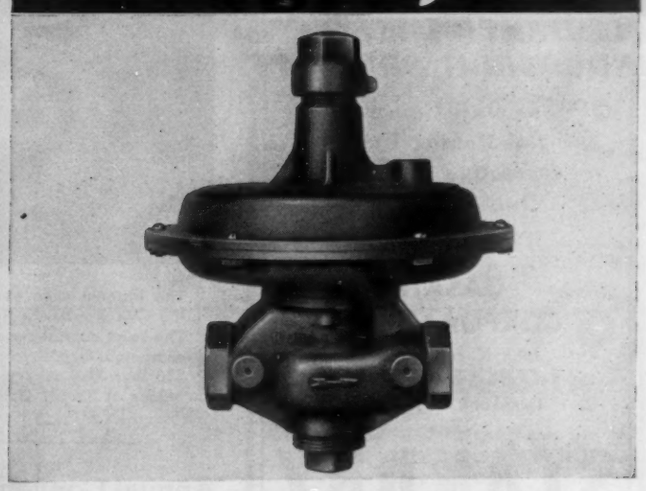

The New Series of REYNOLDS Low Pressure Regulators has greater capacity than any comparative Single or Double Valve Regulator. It has fifty percent greater capacity than the same size, old type Regulators. Everywhere engineers who have tested it admire its remarkable performance.

All of this without loss of the Reynolds Accuracy—the Unequalled Sensitiveness—and Rugged, Long Lived Service. Write for details as to how this new Regulator will solve your Low Pressure Gas Control problems. Let our Engineering Department assist you.

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GASAIR MIXERS AND VAPORIZERS

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ELIMINATE UTILITY & INDUSTRIAL SHUT-OFF

"The Only Complete Gas-Making Unit Operating Without Outside Power"

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STANDBY

The biggest cake ever baked in Sacramento was featured by the Sacramento Unit of the Gas Appliance Society of California during its recent Spring Gas Range Campaign. The cake commemorated the second year of manufacture of the CP range to which the campaign was devoted. The cake measured 48 in. across and 12 in. high and weighed 280 lbs. The cake was cut and served to approximately 5000 persons who visited the offices of Pacific Gas and Electric Co. in Sacramento, where the cake was on display.

ELIMINATE CONDENSATION TROUBLE

VITROLINER
—the permanent chimney lining that totally eliminates chimney deterioration caused by acid-bearing moisture deposited by all types of fuel. Made of Armco Ingot Iron, vitreous enameled both inside and out.
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2515 Archer Avenue - - Chicago, Illinois

Annual Convention Held By Indiana Gas Association

The 30th annual convention of the Indiana Gas Association was held in Evansville, Ind., May 13-14. F. B. Culley, manager of the Southern Indiana Gas & Electric Co., acted as chairman of the program committee. The following officers were elected for next year: E. C. Weston, Indiana Gas Utilities, president; F. B. Culley, vice president; H. W. Thornburg, Central Indiana Gas Co., secretary-treasurer, and R. A. Gallagher, Public Service Company of Indiana, E. G. Peabody, Citizens Gas & Coke Utility, and H. G. Horstman, Public Service Company of Indiana, were elected directors.

Extensive reports were made by Dr. John R. Bray and Prof. J. M. Krappe of Purdue University, where the Association maintains a chair of applied research. A highlight of the convention was a speech by Louis Ruthenburg, president of Servel, Inc.

■ ■

Ruud Manufacturing Co. Acquires Welsbach Co.

The Ruud Manufacturing Co., Pittsburgh, Pa., has recently announced its acquisition of the water heater business of Welsbach Co., effective May 1. The Welsbach line of water heaters and accessories and Welsbach gas range burners, produced for more than 50 years by Welsbach, will be continued by Ruud.

■ ■

Pacific Section, L.P.G.A., To Meet In Santa Barbara

Sponsored by the Pacific Coast Section, Liquefied Petroleum Gas Association, the first annual Pacific Coast Liquefied Petroleum Gas Exposition will be a feature of that association's two-day meeting scheduled for June 27 and 28 at the Municipal Auditorium, Santa Barbara, Calif.

According to C. L. Parkhill, chairman of the Pacific Coast Section, the exposition will feature a complete cross-section of the industry's latest equipment, domestic appliances and fuel consuming applications. John H. Kunkel, sectional secretary, Los Angeles, is in charge of the event.

■ ■

Foods Contest Winner Given Trip To Washington, D. C.

National winner of the High School Foods Project-Contest, recently sponsored by Servel, Inc., and *The Student Home Economist*, will visit the nation's capital during the week of June 12-19. The trip was offered as first prize for the winner of the contest, which was entered by more than 8000 students throughout the country.

Bruce Barton, United States representative, editor and writer, is one of the 10 judges of the contest. The judging committee also includes Elizabeth Sweeney, household technology department, Syracuse University; Jessie McQueen, A.G.A. home service councilor; Karen Fladoes, home service director, Peoples Gas Light & Coke Co., Chicago; and Jane Tiffany Wagner, home service director of Servel, Inc.

■ ■

F. A. Hornaday, Texas Gas Pioneer, Dies

Fred Alvis Hornaday of the Rio Grande Gas & Electric Co. died in San Antonio, Texas, recently, at the age of 65. A pioneer in the natural gas business in San Antonio, Mr. Hornaday founded the old Southern Natural Gas Co., and started the movement to market the natural gas found in the Southwest, which resulted in the formation of the present United Gas System.

AUG -0 1941

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AND TRAFFIC WENT ON AS USUAL

The photograph to the left shows a Greenlee Hydraulic Pipe Pusher being used to push pipe under a newly paved street, which is part of National Highway 20. Had it been necessary to install the pipe by trenching, it would have been an expensive job, not to mention the damage to the pavement and the inconvenience to traffic.

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Here is a tool that is easy to take to the job and simple to set up and operate. It has capacity for 4-inch or smaller pipe and will develop a pressure of 40,000 pounds against the pipe clamp. Since it operates on a notched steel base, the pipe clamp is reset only when the end of the base is reached.

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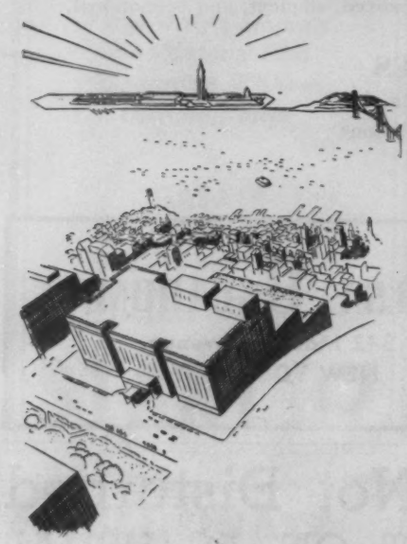

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Report Shows Pipe Lines Grow Without Public Aid

Oil and gas pipe lines are the only form of transportation which has paid its own way, in entirety, throughout 75 years, without benefit of public aid, and at the same time have contributed to reductions in prices of petroleum products, it has been reported in "Public Aids to Transportation," released by Joseph B. Eastman, chairman of the Interstate Commerce Commission, and former Federal Coordinator of Transportation. In only a few instances has anything approaching public aid been given for pipe lines. These few instances related only to the occupancy of small pieces of the public domain for right-of-way purposes and pumping stations. Actual records showed only $2,954 worth of public lands used by pipe lines; estimated value of additional acreage occupied increased this amount to the negligible total of $76,921. In contrast, the study revealed that public aid to the railroads has amounted to approximately $1,443,000,000.

■ ■

Chelsea Co-Operative Co. Operates With Profit

The Consumers Co-Operative Gas Co. of Chelsea, Okla., at its first stockholders meeting announced a profit of approximately $1000 for the first five months of operation. Nearly $4000 has been invested in the company by 300 stockholders, it was reported, and meters, regulators, pipes and other equipment amounting to $2548 have been purchased by the company.

During the five months of operation, about 11 million cu. ft. of natural gas has been consumed by the company, which rents lines from the Gas Service Co. of Bartlesville, with an option to purchase within five years.

■ ■

New England Divisions Meet

Meetings of the Industrial, Sales and Accounting Divisions of the New England Gas Association took place during May. House heating, space heating and water heating were discussed at the meeting of the Industrial Division, held May 10 in Boston. The Sales Division met May 24 in Boston, and the Accounting Division meeting was held May 28 at Malden.

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Looking through the entrance into the new reception room of the Chicago Vitreous Enamel Products Co., Cicero, Ill., which is finished with shining black porcelain enamel topped with clear glass panels set in bronze. The back wall of this compartment is finished in calfskin brown which blends well with ivory porcelain enameled panels.

Sioux Falls, S.D., Utility Sold to Iowa Company

Announcement has been made by R. A. Phillips, vice president of Central Electric & Telephone Co., Sioux City, Iowa, of the purchase of the Sioux Falls Gas Co.'s properties by the former firm at a price in excess of $1,500,000. Actual possession occurred on April 1. E. C. Deane, who has been the company's office manager, has become manager.

The Central Electric & Telephone Co. also operates gas and electric properties in 23 other communities in North Dakota and Nebraska.

■ ■

Large Industrial Contract Given to Southern Utility

Signing of a contract to supply the Flintkote Co., of Meridian, Miss., manufacturers of wallboard, with 360,000,000 cu. ft. of gas each year was announced by L. L. Gordon, president of the People's Water & Gas Co.

Mr. Gordon is maintaining temporary offices for the company in Chattanooga, Tenn., and plans to move to Birmingham, Ala., within the next several months. The People's Water & Gas is already serving Meridian. It will be necessary to build a 2-mile pipe line to the Flintkote plant, Mr. Gordon said.

■ ■

Princeton Utility Sale Followed by Changeover

The Princeton (Ill.) Natural Gas Co. has recently purchased the physical property and franchises owned by the Princeton Gas Co., following authorization by the Illinois Commerce Commission. The properties were purchased for $23,500. Also authorized by the Commission was a changeover from manufactured to natural gas for the purpose of increasing the heating value of the gas from 565 B. t. u. per cu. ft. to about 1000 B. t. u.

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The stuffing-box principle is an engineering fundamental. Adapted to cast iron pipe requirements, in the form of gland-packed rubber ring mechanical joints, it assures permanently leak-proof performance at high pressures. This has been demonstrated not only by A. G. A. laboratory tests but by more than a decade of service. Available from C.I.P.R.A. members in various designs identical in principle.

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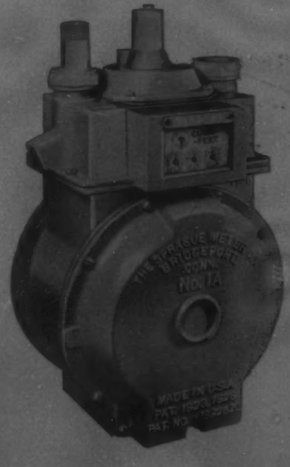

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